METHODIST QUARTERLY REVIEW.

JANUARY, 1877.

ART. I.—LANGUAGE AND HISTORY.

THE new science of Linguistics has been, like every other, forcibly impressed into the service of skepticism. Its parents and best friends declare that this is not a voluntary enlistment, and they demand its release from an enforced service. The moment is a favorable one for setting forth some of the reasons why language is not a lantern to search obscure regions of history, or a witness to an immeasurable length of human development, or even a safe instructor in the growth of human ideas. The moment is favorable, because the philosophy of human progress is once more in the foreground, after having been for some years overshadowed by physical science. We once more definitely recognize the necessity of reasoning together. A few bald physical facts no longer assume to set aside logic and render philosophy contemptible. Many who were recently bewildered by the unexpected phosphorescence of bogs that had long lain in darkness, perceive once more that the sun is still the light of the earth and lord of our skies. The facts of development, whatever they may be, must be lightened upon out of the understanding, and their value estimated by the processes of human logic. The significance of a fact is to be gathered by a painfully minute attention to all its surroundings, and by a more laborious study of its relations to the whole world of knowledge and the entire government of the reason. We cannot declare that evolution lies in the vast abyss opened under

us by theorists on the testimony of rocks alone—making their supposed *ipse dixit* final. There are laws of interpretation, comparison, evidence. The very language of nature requires an interpreter. And every utterance must be analyzed, correlated with other sayings, and used, when sifted of all doubts, with the caution and discretion essential to all sound inference.

No new and royal road to truth has been opened by scientific discoveries. We must use our judgments, compare our knowledge, and, at last, we must *philosophize* upon it. New facts *may* confute old philosophies, but it must be in fair battle. Victory cannot be gained by marching off in the opposite direction, or by a flanking march. The camp of philosophy must be captured, for its equipments and its camping-grounds are necessary to the hostile forces. These general truths are more fully appreciated than they were a few years ago. The sober second thought is *regnant.* Agassiz gave evolution five years in which to run its course. Are we witnessing at the end of two of those years the first flagging of that spirited racer?

The time to examine the ground upon which we stand has come, and language must be asked for its exact testimony concerning the history of man on the earth. The purpose of the present article is to strip that testimony of three false interpretations. It is unfairly used to teach that *man has been for a very long time upon the earth;* that *it is itself older than recorded time;* that *it is an authority for the history of venerable ideas*—ideas so old as to have no date in history. The last false interpretation is more important than it seems, and the too hasty acceptance of it by some scholars may cause great mischief. Language, like other human faculties and arts, had a foundation in our original endowments, an elaboration in practice and experience, and has been the subject of a wide range of modifications. Its beginnings are nowhere recorded except in Genesis; its early growths are more completely lost than any others that have sprung out of the nature of man. Its present (and recent) condition, varieties, and laws of change, are our best field for its study, and we have not gone over a hundredth part of this. Speech habits in the historical period are imperfect guides in the unknown times when men first spoke. Admitting that they began as our children do, this will not help us to understand their learning to talk without an

older generation to teach them. There are growths, such as the demonstrative roots, which have no analogies in historical experience; we cannot compare the process of their development with our own changes of words. Terms that have kept for a long time a common base of signification in widely-branched classes of tongues shed no light on the growth of ideas; for the secondary meanings, not the primary, need to be one, (for the argument,) and the survival of the original base makes it unsafe to reason that the secondary sense has been in use at any particular unknown time. The root *pu* (pure, purge) has to this day a higher and a lower sense; we dare not infer the higher sense merely from the wide diffusion of the root. Language is, as a growth, a child of the intellect, not of the lip.* There is abundant proof, to be sure, that lip-change (unnoticed by the ear) has led to intellectual change, and *vice versa;* but we must seek in mental processes for the evolution of every thing that dignifies speech. An optative mood is not a matter of articulation; a mental process comes to permanence by seizing upon an articulation for a house; but the process must have gone on, and the process must continue to go on. There is, then, a study of intricate mental processes, rather than of mouthfuls of vocalized air, at the bottom of every linguistic investigation. How old is language? means, How old is the human intellect? If we had any certain means of determining at what age, or in what necessities, or by what stimulations of desire, man's intellect accomplishes any great step forward, we might use it in language; we have no such time-rate or thought-gauge. We must be content in this field to take all the helps from without, to adjust the knowledge we obtain about speech as well as we can to the generally received chronologies and systems of philosophy. Language is a servant and a minister—a most useful one, but still a servant. Language has no ascertainable chronology of itself, much less of man and his other institutions. These thoughts will be explained more fully in the following pages.

I. Does language assert a high antiquity for human history? The most instructive aspect of this question is presented in

* "No language is a *mere* collection of words; and Locke, in all that he has written about *words*, has offered no proof that any system of *syntax* is ultimately due to sensible ideas."—*Farrar: Origin of Language*, p. 162.

the institutional character of language. It is a human habit, a custom, an institution. We may waive all questions concerning the origin of language; however they may have begun to talk, historical men have been talkers; and their speech, so far as it can be traced backward, has always been subject to the general conditions that surround habits. Among these conditions are those of change. There is a permanent and a changeable element in man's development. In language this permanent element is that man talks;* the changeable element is that he talks differently in different times and lands. He changes his language though he does not cease to talk. In this respect, lingual habits resemble others that rise to the dignity of institutions. They rest upon a permanent base, and they rise from it in diverse and changing structures.

For example: Man is political; some form of government is essential to his social expression; but this habit or institution runs into large diversity, and is, indeed, subject to subtle variation wherever human vitality works with any freedom. So in language; the permanent base remains, the superstructure undergoes perpetual change. The relations of the sexes furnish another example. The institution of marriage has its base in sex difference; its vast range of diversity, and its subtle and complex changefulness, are due to the power of man over his habits. Manifestly the base or permanent element is worth nothing for historical research. Its definition, as unchanging, imports that it is useless as a key to change, or an explanation of a mutable order of things. And in history we are concerned with what changes. Something happens to a people. We shall not explain it by saying that they have a speech, were addicted to government, and were of two sexes. But if we know that their government was a monarchy, their speech Aryan, their marriage Monogamic, we may be a little helped to understand the change. As a rule, however, the inferences we base on such an amount of information concerning institutions want trustworthiness. Modern historical

* The people who do not talk always turn out to be talkers. The last time it was publicly stated that the Veddahs of Ceylon have no language, Max Müller had the matter investigated. It turned out, as it has always done in other cases, that there was plenty of language, and very good language, too; "Many of the words are mere corruptions of Sanskrit."—*Chips*, vol. iv, p. 342.

writing has sought to give value to its work by penetrating far more deeply into the changeful side of institutions. How bald the old generalizations—"Sparta was a kingdom and Athens a republic"—compared with the minute description of the mechanism of these governments furnished us by modern histories! When we deal with institutions as parts of a national life, we need to know them somewhat intimately before we make them the grounds of inferences, the explanations of political changes; and, as a rule, the more nearly our knowledge approaches completeness the more useful it becomes; nay, it is possible that the last day's work may upset all the reasonings of former study.*

If we consider the changeful character of language, we shall find abundant reason for desiring minute information before we build a house of inference upon it. The story of the science of language is full of false inferences, set up one day to be pulled down the next. Some of these failures are the fruits of stupendous egotism in the self-conceited authors of them;† but many more were very sincere guesses at truth, fortified by a deal of misplaced learning. Nor have we a right to reason that here and now the danger of error has been removed. Our knowledge, as we shall presently show, wants as signally as ever the minuteness that will warrant sound inference.

The incompleteness of a linguistic test of historical facts is somewhat greater than that arising from the use of other institutions in the same way. Marriage has been cast into a few simple molds, and has always indicated, with some definiteness, a few other social habits. Government is commonly of such a public and ostentatious character that some of its lines surviving are the first signs of national wreck. Religion tends to more stability, even in the variable factors, than any other

* The theory that language is an institution should be credited to Prof. Whitney. Prof. Max Müller makes faces at it, but gives no sound reason for rejecting it.

† The description by Plato is still applicable to a good deal of theorizing: "I have not a bad notion which come into my head only this moment. I believe that the primeval givers of names were undoubtedly like too many of our modern philosophers, who, in their search after the nature of things, are always getting dizzy from going round and round, and moving anyhow; and this appearance, which arises out of their own internal condition, they suppose to be a reality of nature."—*Cratylus*, i, 650.

outgrowth of the mind and heart of man. But language is subtle in its changefulness, and very wide differences spring from narrow bases. About forty characters, or sounds, run into endless combinations, and the combining law may be so subtle as to require the finest discrimination for its discovery. Take a classification: Let the three forms, *New town*, *Newton*, and *Naples*, stand for a morphological classification of languages. The student's first trouble is that any civilized tongue will furnish him, as English has done, with the types by which he is to distribute them into classes.

But let us imagine ourselves testing historical statements by some other institution. Let us say that we have undertaken to unravel a tangled story of the British Kelts. It occurs to us to settle the matter of the Arthurian legends by an appeal to the governmental habits of the people. We shall be at once reminded that we do not know the details of the governmental institutions except through the legends. The general information derived from other sources is worthless for our purpose; the legends assert certain details concerning which we have no other information. We should require to know so much as to need no help from our test in order to know the test. Equally true would be the statement when applied to language. When we have so mastered our test as to be able to use it, we should no longer need it. The completeness of knowledge required implies a like completeness in our knowledge of the life of the people concerned.

It is time to remind the reader that an institution is not merely something set up—it is something grown. It is a result of vital ongoings and interflows of sap between root and branch—of reactions between men and their institutions. The heart of a people, as well as the brain of a people, takes form in the institution. But who can read it backward and spell out the fine type in which love and loyalty, inveterate hatreds and obdurate evils, write themselves into page and volume? The sublimest ongoings of human life come to record in a complexity that baffles our skill in discrimination, and makes it doubtful whether the keenest intellect with the richest furnishing has ever unraveled the making of even one human institution. Sir John Lubbock's attempt to trace the least complicated one—that one in which the permanent factor is

confessedly largest—the institution of marriage, was made with great learning and no common critical faculty. But who would stake his fortune on the soundness of the results?

We take language as a test of history, and must begin by confessing that a bald grammar and a fractional dictionary, containing a tenth, perhaps, of the whole vocabulary, are our whole lingual equipment. We do not know one word for certain of the popular speech; a few pieces of a literary or political sign-book are pretentiously styled a language, and asked to tell what dead witnesses have left unsaid. The whole business is a splendid delusion. We fancy that, because language is penetrative, subtly pervasive, common carrier for all vital functions in society, concerned, with every thing, and used, like the tub of Diogenes, for every purpose, forsooth we can learn it from a bit of lexicon, and there learn all its associated activity.

The truth is that we must know the whole of the language, and that when we know the whole of it there will be no historical questions; for in mastering the whole of the language we shall have studied every thought, custom, and emotion which it described. The amazing self-conceit that can build hypotheses of grave concernment on linguistic data appears when we recall our ignorance of the *spoken* dialects even of the Greeks and Romans. The test of language applied to the mutations of the Roman Constitution is nearly worthless because the book speech in which those changes come to record is a very imperfect display of the thoughts and conflicts, the interests and passions, which led to change. We need the popular terms in which wrath and prejudice recorded themselves. Imagine the difficulties of our political history, so short and made in such perfect sunlight, if we had not those epitomes of political life, our slang terms "Loco-foco," "Barnburner," "Silver Gray," "Kitchen Cabinet," etc. All that and all its correlatives are hopelessly dead with the dead popular speech of the whole ancient world. When now and then a poet like Aristophanes has stooped to these vulgar forms, he has enriched us not a little in suggestion; but the suggestion is always vague, and stimulative of the imagination rather than guiding to the judgment. The writer once conceived the task of writing the history of the little Republic of Genoa. He had before him the finest

extant collection of social documents in the records of the Bank of St. George. This bank combined the functions of the modern bank with those of a Custom-House, a Probate Court, and a "Safety Deposit." For centuries its books threw a clear and strong light upon the social customs and personal vicissitudes of the whole people. But a very early lesson in that magnificent presence was that lexicons were practically useless. The perfect comparison of this vast collection of records was a preliminary task—the labor of a life-time—for understanding this polyglot and dialectic tongue. And if all that had been done, there remained to lament an irretrievable loss of the figures under many a term—a sharp and terse sense had gone with the life that wrought these terms.

We only feebly comprehend, even when we distinctly think it, how new is our one speech for all the people. Most civilized peoples are dialectic to this day. Lovers at Naples and Milan woo in different tongues; the mother-tongue is different in every valley of Italy; and, in less measure, the same is true all over the old world. Even in England, the dialect vocabulary is as large as the literary. Beyond Rome and Athens we plunge into an impenetrable fog because the popular speech is utterly unknown to us. How vast must be the presumption that attempts to correct the testimony of the Scriptures by the chance-found fragments of contemporaneous speech!

How pale and cold is the image of a past life which we recover by the fullest lights of history!* When all aids have conspired, much of the liveliness of Grote's History comes from transferring the vital consciousness of Englishmen to the shores of the Ægean. We fail to catch the difference of tone, of atmosphere, and fancy that by broadening the kinship of our na-

* Of these nations, [early Semitic,] with the single exception of the Israelites, we have, properly speaking, no history. Their manners and customs, [a little,] their religion, the succession of their sovereigns, are known to us. But we have no continuous series of events; although the knowledge of them is fuller, through the investigations of the last fifty years, than in former times, yet it is still shadowy, fragmentary, mythical. They are like the figures seen in the dream of Sardanapalus, as depicted by the modern poet; here a mighty hunter, or conqueror like Nimrod, or Sesostris, or Sennacherib, there a fierce and voluptuous queen like Semiramis—yet

"All along
Of various aspects, but of one expression."

—*Dean Stanley's Lectures on the History of the Jewish Church*, Third Series, p. 52.

ture we may think and feel like a Spartan or a Cretan of the ancient world. It is pure conjecture, and the best history becomes entertaining historical romance. The subtle organs of its life have perished, and we are left to shrewd guesses, filled in with our own temper and desire.

No doubt, then, it may be all true that language would disclose all secrets—if we had it. But, for antiquity proper, we have scarcely a shred of that language which enshrined the molding emotions and aspirations of social existence. We can only shrewdly guess what words the people spoke in the cities of Egypt, of Babylon, or even in Jerusalem. Their *ipsissima verba* died with their generations and are hopelessly lost. Look at the vast labor of the early English Text Society over the English speech between the years 1200 and 1600, and who of us that has followed these arduous toils with most satisfaction feels any assurance that we have more than grazed the popular consciousness of medieval England? So little of what Englishmen of those centuries said has been preserved, and so much of our treasure wants the color and ring of the ancient metal, that we distrust our glossaries as a counterfeiting of the coin of the dead.

The Elamites could not have been Semitic, because some memorials from beyond the Tigris belong to the Elamites, and the language disproves the statement in Genesis. So says, in substance, a bright scholar in the British Museum. Probably he had not stopped to think of the wildness of his conjecture. 1. There is no clear proof that the original Elamites either remained in the region or emigrated from it. 2. There is no proof that they ever settled the particular city whose ruins have come to light. 3. There is no reason to believe that all the descendants of Shem continued to speak a Semitic dialect, but the contrary. 4. If an Elamite city were conquered by an Aryan tribe, the official language might become Aryan, and only that survive in records. 5. It is presumptuous to assume that the records were found *in situ*—that is, upon the ground where the history was made to which they refer. These statements are made very broad, to answer for many cases. If we have any reason to doubt the Semitic blood of the Elamites of the prophets, our doubts depend on other evidence than that of language. The language of the region in

question may have changed a dozen times between Chedorlaomer and Cyrus; and there is, probably, not the faintest evidence as to what language the people at any time spoke.* Of the State dialect, at different epochs, fragments may survive, but the more or less permanent people have left no sign.

It ought not to be necessary to record over again one caution, which, happily, we have near reminders of. We every day speak of "The Indians," preserving, against our knowledge, the error of the early discoverers of this land. An accident has given us a false name, but we go on using it because it is a small inconvenience to change. If a name can be so bald a lie in our mouths, what may it not have been in the older and less instructed world? Every ancient people was known to itself by one name, to its neighbors by another. A conquest might fasten the nickname on the people; a misconception of the name, or a translation of it, or both, might give rise to a third or fourth. Popular vanity might trace the national lineage to a false source, just as kings acquired divine descent. Blunders in names alone would confuse many a chapter of ancient history *did we depend on language for our information.*

To these observations must be added a suggestion upon a much-neglected theme. The migrations of the ancient world, especially of the earlier ages of man, are almost a sealed book. Language is absolutely worthless as a key, for several reasons:

The *status* after any given set of movements, say those which followed Babel, has, probably, been altogether changed in the next century, and successive changes have washed out the landmarks of each other. Race lines settled at last into some permanence; but the border lines, except when boldly defined by sea or mountain, remained dim and wavering. In the mutations, race and language ceased alike to be pure-blooded. Semitic blood took up Aryan speech, and *vice versa;* the races mingled more or less, and the entangled lines will never be separated and straightened by study of royal monumental literature.

* The terms *Elam* and *Elamite* in the Prophetic Books set up no claim to ethnological or linguistic accuracy. Persia is still called Persia after greater changes. But there is no difficulty in supposing that the original Semitic stock continued to dwell in the old lands, though it did not govern. Perhaps the most confusing race mixtures belong to this very region.

The facility with which people change their speech is too often overlooked. We say English without taking in the vast breadth of the term. We cannot half read Chaucer even with a dictionary. To comprehend him would require the labor of a life-time. The author usually styled Caedmon is even less comprehensible, although his scriptural themes take away nine tenths of the difficulties. An unintelligible English may be heard by taking a half-day's journey from London. The body of the North French people have, probably, spoken Keltic, German, and French within a period which is short compared with the periods of antiquity to which linguistic tests are applied. In Britain several dialects of Keltic, English, Danish, Latin, and French, with variations, making an aggregate of twenty diverse tongues, have been spoken since the time of Julius Cesar. The intercommunicating body of Englishmen spoke Danish, English, and French successively within the compass of a century and a half. The body of the Jewish people probably changed their tongue at least three times in eight centuries. Whenever we deal with long reaches of time, we are compelled to take account of this instability of speech as a cause of apparent race confusions, as a *possible* index of the change that arrests our attention. For the causes of these changes in tongue are almost always violent. As we approach the infant world, the instability of speech increases under the double action of migrations and violence—both of which act in earlier human history with vastly greater force than in our modern and properly historical period. We must know by other tests before language can render us more than hypothetical aid; intimate knowledge it cannot give us.

II. It has been fancied that language asserts for itself a high antiquity. The inquiry necessary to establish this proposition has some difficulties in common with those in other branches of knowledge that face the same question. Whenever we dispassionately consider any problem of time as related to the earth or to human development, we are menaced into diffidence by the want of a time-measure of growth. All that we have are for such small uses that it is like dipping the Atlantic dry with a pint cup to apply them. A measure of time is not a gauge of eternity; and high antiquity is only another name for what is practically eternity. A rate of deposit for mud at

the mouth of a river will be differently calculated by different men. The delta of the Mississippi has been formed in a relatively brief period, or in an eternity of time, accordingly as you credit different scientists.

But throwing out all such cases, and presuming that exact measure is possible in all such cases, how do you apply the unit of measure so obtained to the vaster problem presented by rivers that ceased to flow before man beheld them? In your measure the conditions of the problem, made up by natural selection out of a vast body of possible conditions, are all neatly outlined before your eyes. In the other case you cannot know the actual conditions that played around the event and shaped its progress. And the moment you assert for this unknown movement—of which nothing survives but its result—"a high antiquity," you definitely declare its growth to be beyond the reach of human calculation. But, whatever view be taken of this reasoning, it will remain true that time-measures are not exact enough to render effective service to any theory.

In language this defect is peculiarly striking. We know next to nothing of the conditions of early linguistic growth. What we know exactly on the subject of such growth in general, we know only from our own lingual habits, and those of our contemporaries and immediate predecessors on the earth. This knowledge is not adapted to furnish any time-measure, for the simple reason that we are not making language *ab initio*—we have it and are changing it. We cannot so much as begin an inference as to the rate of progress among men making language. If we add to our exact knowledge of contemporary change the whole body of historical learning in this science, we are still without a time-measure; for our historical knowledge terminates before we reach the original makers of speech.*

It may, perhaps, be affirmed that classification of languages

* Some hold that the power of inventing names still exists. I think the concept under the words is in confusion. When the French people said *plon plon*, they had some imitative notion under it, but it is not agreed what it was. Nonsensical combinations of sounds are not names, and imitative vocalization is not now like original name-giving—it is working a vein long since discovered, not finding gold. The *materials* of nicknames are always old. On the other side of this subject see Farrar, "Origin of Language," p. 70.

enables us to penetrate very far before the historical period. Some have thought so, and there are under classification *theories* that require a "high antiquity." The theories are, however, only hypotheses benevolently treated because they promote work. The genetic classification has called forth some of these theories. But this classification lends but little aid to those who would see far down the ancient abyss. It deals with only a small part of human tongues; it is very incomplete, and uncertainly made out over portions of its best traveled territory, and what it says about time and growth cannot well be translated until the witness has established his own personality. Make out your classification before you marshal its divisions on the plains of eternity.

Other theories are employed hypothetically to explain the perplexing problem presented by a morphological classification which assumes that Chinese is a primary stratification, Turkish a secondary, and English a tertiary. We should be helped to understand a hundred matters that drive us to despair if we only knew the time-gauge of language. How long did men speak with naked roots? How long did they combine without breaking up the separate structure of roots? Why, at the outset, these questions are balked by the fact, assumed in the hypothesis, that some people have been talking in bare roots through all the ages of man. Given as an hypothesis that modern Chinese is the infant prattle of the antique world, how long does it take a language to get into the secondary stage? Given an English language whose ancestors and congeners have been in the tertiary stage from the earliest moment in time when they are known to us, what is the time-measure for the rate of change in human speech?

The amount of time required to change *vak* into *vaks*, to develop an optative, or to form demonstrative roots, is just a shrewd guess—and probably can never be any thing more. Those processes are not now going on, or if they are, *ex-hypothesi* they are proceeding so slowly that we cannot sense the motion. We imagine that we should be greatly helped in tracing these processes of formation if we knew how fast they proceeded; and wherever such an imagination plays there will be time theories. Trying them with the other facts may stimulate observation, as scaffolds help in constructing houses;

but the scaffold will come down if the building is ever finished. Our vision is for time, not for eternity; and to assume an immense antiquity for any thing is to put its growth beyond the domain of exact knowledge. It is the fashion just now to use indefinite time as scaffolding around the temple of the new knowledge; a large number of difficult questions looked to be accessible from that staging. It had to be tried; its philosophy was left for later consideration. Various groups of investigators have tried, with more or less self-satisfaction, the eternity solution. "You cannot affirm that this might not have happened in ten billions of years." No; on that hypothesis you would negative nothing, for all your knowledge only qualifies you the better to anticipate unknown and imponderable conditions in the awful abyss opened under the given theory. But this is not science—this asserting that one or another thing might happen in a billion of years. The other assertion is equally true—you cannot know *that* it would come about as your theory makes it. There are indications that the reaction has begun. It is not a pleasant confession to make, that science is impossible—that we cannot connect our actual knowledge by verifiable general propositions; and it is beginning to be perceived that to send all growth back into the bosom of eternity is to rob us of all means of verifying it, and correctly formulating its laws.

In language enough work remains to be done with the portion of the field that all agree lies in the historical period; and most linguistic students are content to explore these fresher tracts of growth. We may yet find within them some of the treasure we cannot expect to raise from the bottomless gulf of innumerable centuries. If the truth is in that awful well we shall never find it; possibly it may be sparkling in brooks that babble past our own doors. A noticable discontent with the mystery surrounding afar-off growth is one of the most cheerful signs in linguistic writings. We retain a chance of obtaining a full round science of speech so long as this group of scholars reject hypothesis that would vail their science with despair; for when it shall be definitely admitted that every essential principle of growth pushes its roots into an indefinite past, it will be as definitely admitted that linguistic science is impossible. If plurals, optatives, and demonstrative roots are

children of eternity, we shall never know how they were born into human speech.

Every question sought to be solved by a vast antiquity has a humble fellow justly entitled to the same honors. It is said that Aryan and Semitic speech broke away from each other a very long time ago—the unity of human speech cannot be maintained, in the face of the differences in these groups, except on the hypothesis of the very high antiquity of human speech. To this it might be said that unity may not require that Aryan and Semitic speech should be branches of an older speech in such definite mode as Greek and English meet in ancient Aryan. A very early separation—early in development, though it were only five thousand years ago—would probably bequeath no permanent, more common, traits than those which exist. But passing this simple explanation, which is worth more working than it has had, compare the great fact in question with a relatively small one. Our American languages are to be furnished with congeners, and to be traced out on a time-plane. Granting that the congeners are easily found, how long a time did the development of the special characteristics of these languages consume? The question is an inviting one in many aspects; but it is started here only to suggest—if we are so disposed, we may invent eternities at pleasure as explanations of linguistic mysteries.*

There remains in this branch of our subject one important consideration. In language we are dealing with processes in the human mind. All the physical difficulties to be overcome in men are too inconsiderable to be considered. A plural or an optative requires a mental process for its development. Now, how long does it take men to reach this process and go

* Max Müller, "Chips," vol. iv, page 340, says: "Every one of these languages is the growth of thousands *and thousands* of years, [*one thousand* would suffice,] the workmanship of millions and millions of human beings. If they were now preserved they might hereafter *fill the most critical gaps in the history of the human race.* At Rome, at the time of the Scipios, hundreds of people might have written down a grammar and dictionary of the Etruscan language, of Oscan or Umbrian; but there were men then, as there are now, who shrugged their shoulders and said, 'What can be the use of preserving these barbarous, uncouth idioms?'" We make the quotation for a double purpose, to show the value of these American dialects, and to point out the way in which this scholar gets into trouble. The words we have italicised are rhetorical exaggerations; he does not believe what they teach.

through with it? One may guess; but he cannot know that men must have talked ten thousand years first. It is much more probable that it was reached soon than that it remained for ages a far-off event. How long does it take men to invent any thing? A simple theory is that it took them until, in a kind of dumb consciousness, they needed it. Ten thousand years has been assumed for the invention of a bow and arrow. The guesser had to shut off a ready retort by assuming an accelerated rate of speed for ages of invention that found steam and telegraph in a single generation. But the moment one mentions a varying rate of progress, or a principle of increasing velocities, we are at liberty to conjecture anything—especially that the rate of motion may have been swifter up to bows and arrows. In the presence of an imperious need the intellect moves more rapidly than in the languid atmosphere of satisfying abundance.* If it be the first step which costs—and in language this is greatly true—one may infer that the dumb consciousness that works in speech worked out its inventions with great rapidity. It is perfectly possible that all the chief diversities in speech were reached soon as a consequence of separations that occurred early in human time, and the infant recollection lost the common speech habits as it lost the sense of brotherhood. So, on the other hand, the great lines of resemblance were formed by more enduring association, fixing some abiding habits, in fellowship with vast ranges of variation, such as pervade the Turanian family. More permanent associations gave birth to more numerous common habits, having a less numerous company of variations, such as we witness in Aryan languages. Still closer life blossomed into those symmetrical forms which run through the Semitic group.

There is nothing in any of these hypotheses which hints at a longer human speech history than our common chronology authorizes. Some wonderful growths have unfolded into surpassing completeness in brief periods. All the modern Latin

* As we are no longer obliged to create language, we have entirely lost a crowd of processes which tended to its elaboration. But among the early races there was a delicate tact enabling them to seize on those attributes which were capable of supplying them with appellatives. . . . "They saw a thousand things at once, and, indeed, their language-creating faculty mainly consisted in a power of seizing upon relations."—*Farrar:* "*Origin of Language,*" 1860, page 68. How long did it require to make a language under such a head of steam?

tongues are examples. Granted that Italian was not made by Dante, or by a preceding generation of poets, a vast development occurred in a relatively simple speech in the space of a single century. It is a barely possible hypothesis that Italian, Provençal, French, and Spanish, were ancient modes of Latin; but if this were granted for truth, it would remain true that they shot into a luxuriant growth with astonishing rapidity. It is cheerfully admitted that Neo-Latin does not help us in matters which these tongues received by inheritance; they do, however, bear witness to a considerable velocity, under a supreme necessity, in the mental machinery which manufactures linguistic inventions.

Intending to treat this problem cautiously and as fully as our space permits, we turn to a question or two involving the time-measure. The one about Aryan and Semitic divergence —a divergence so wide as to have left small traces of unity— is it not as satisfactorily explained by the theory of an early separation as by that of vast ages of growth? If these languages grew apart, they would, more probably, be totally unlike if their infant growth were apart. A hundred years, then, would efface resemblances that thousands of years would not efface after speech-habits had been formed.

The whole range of diversity, and all the questions that arise under that head, are best reserved for further study; but if we must theorize we shall do well to exhaust the theory of varying degrees of association and separation. Intricate questions may be at least helped to settlement by the fact that inhabitants of neighboring valleys of Italy cannot now understand each other, and by the fellow-fact that their speech is essentially one. In low stages of culture, and under separation, men go on speaking substantially alike, and yet are unable to master the differences in each other's speech. Put the same men under culture, under the pressure of multiplying social activities, and they will diverge more rapidly, or one speech will sink into servile relations to the other, according to the nature of their associations, whether near or remote—that of equals, or of master and servant.

In short, let it be clearly said no body of knowledge is of so little direct service to other bodies of knowledge, and none needs so much help from others as linguistics. If history could

give a clear account of human migrations, early and late; of the state of culture among the makers of dialects that died and made no sign; of the actual speech of every group of men from the first, linguistics could soon work out some of its problems. These are questions upon which it has no certain knowledge. If anthropology had reached definite conclusions about savagery and the growth of various social habits, other linguistic questions would be settled. Changeable words are unsafe guides in these wildernesses of knowledge.

III. Another class of historical inquiries, on which language is supposed to throw a calcium light, deserves to be considered. Words, we are told, reveal mental states in far-off men. Take the discussion concerning *θεος* and *deus*.* So prepossessed are a class of students with the theory that the word is the sign of the existence of the thing, that to derive these two words from different roots has been thought to assume an atheistic stage in early Greek thought. They lost their *deva*, and for some time were godless; they recovered God, and invented a new name for him. So the logic runs. It is highly probable that the apparent fact under doubt may be no fact at all—the two words may yet be helped to an understanding of their common parentage. But admitting that they are not the same word, why interpose an atheistic period between the use of *deva* and *θεος?* Both may have existed side by side, and Greek alone of the surviving Aryan dialects may have preserved one of the two. Such a poverty as the atheistic hypothesis implies seems a gratuitous assumption. But the real reason for the hypothesis lies deeper. It is, that theory which undertakes to verify ancient ideas by means of words. Often the antiquity of the word itself is questionable, oftener we know nothing of its ancient meaning, oftenest we have only unsatisfactory evidence that *the people* used the word at all. Certain roots, it may be granted, must have been widely used; other derived

* The general reader will find a long discussion of this subject in Müller's fourth volume of "Chips," Note A, page 227. He concludes, I think, the loss in Greek of the Aryan word for god, and its replacement by another word nearly identical in form, but totally distinct in origin, should be left for the present an open question in "Comparative Philology." The grammatical discussion does not touch the question of a "*loss;*" it is only as to whether *θεος* and *deus* have the same origin. I cannot see why three fourths of a question should be surrendered without argument.

forms may owe their preservation to a small fraction of a people.

Now there are just two roads by which we may find a word in ancient use. One is its preservation in different stocks. The same word in Greek and German witnesses to its use before the separation of these races. The other road is its use in literature. This last is worth nothing as a proof of popular ideas. By neither road—and this is most important—do we reach the ancient popular sense. Now take this word *deva*. It is supposed to prove theism in the Aryan race.

We must begin with remembering that the only tolerably satisfactory evidence for an Aryan race at all is that furnished by the affinities of various dialects grouped under that term.* Pure blood is the most mythical of myths. We must also distinguish between the fact that theistic conceptions have existed among Hindus, Greeks, Romans, and Germans. We know this on other evidence than that of language. We must also discriminate between the ideas of our time and those of the far-off world we are seeking to describe. The word *deva* alone, after these considerations have been weighed, does not prove very much. The admiration for the brightness of the heavens which breaks out in the word must have been mixed with other emotions before it could speak a religious dialect, and these other emotions, coming in by various channels from Jewish sources, may have merely used the nearest or handiest word for a shrine. The word itself witnesses to a time of darkness—before any thing more than the brightness of the heavens was meant by it—and some other evidence must explain how the greater glory of God came to be expressed by the term.

The root *pu* (in *purus*, *purificare*, *pure*, *purify*) has been cited as an example of the light words give us upon early ideas. *Pœna* is thought to be derived from this root, and hence an inference that before the civil ideas about ransom, the notion of a purgation, to be effected by punishment, existed in the Aryan mind, and was the soil out of which the civil conceptions sprang—that, in other words, our Aryan ancestors were religious before they had the civil institution of punish-

* Max Müller says: "It is but too easily forgotten that if we speak of Aryan and Semitic families, the ground of classification is language and language only." —"*Chips from a German Workshop*," vol. iv, p. 211.

ment. Now, we may believe these things on other and better evidence, of which there is a good deal, but the religion of the root *pu* is too small a foundation for such a house. Remembering for what different concepts we even now use the word *purge*, we may get a good hold of caution in reasoning from the most ancient *pu* to the modern religious sense of *pure*, or the most distant association in moral ideas. For is it not a most provokingly neutral root? We speak to-day of pure Alderney, pure lead, pure wine, and pure malignity; and we could easily show that the word has always required help to express religious ideas.* The early history of punishment is beset with some difficulties, and the help of a word is too readily accepted by the despairing student. We must be much wiser in both branches of knowledge—words and early primitive ideas—before the word *pœna* can be of the smallest service. Etymology is a delusion and a snare.

These examples might be multiplied indefinitely. We have not yet reached this subject in linguistic investigation. In lines where unbroken ranks of writers fill the spaces to be investigated, we might proceed with ease if we were always careful enough to question each rank as we pass up. But outside of the Hebrew people and the Bible no line of writers stretches to the flood. The mutations of words, both in form and contents, cannot be traced except painfully and uncertainly. Before we assume meanings in antiquity we must account more satisfactorily for a vast number of phonal variations. The moment a linguistic doctrine is asked to bear the load of an important historical explanation it breaks down under the weight. As in the case of *θεος* and *deus*, we fall through into the glottological discussion which never gets finished. In etymology, things that look most alike are really the most unlike; and until the phonal foundations are laid, the superstructure of meanings and derivations must be mostly fabricated of ingenious conjectures. It must not be forgotten how difficult it is to treat linguistic change as a growth. Ascoli,

* The tendency to fly too high is illustrated in the common practice of assigning the meaning of milkmaid to the original of *daughter*. Ascoli pricks a bubble, assigning to the original root the sense "one that gives milk." It is as innocent of sentiment as the word *heifer*. (See *Glottologia*, note to § 36.) The sentiments we associate with the word may have existed; the point is that this term does not show that they existed.

whose work in the field of phonal derivation commands the admiration of all linguistic students, distinctly recognizes the health and sickness of speech, the physiological and the pathological facts. Changes produced by accidents and violences lie under puzzles of a most perplexing character. To explain them we need to know a tract of history whose records are lost. At a critical point in the investigation of the original *Sk* of the Aryan speech—the pre-Sanskrit *Sk*—Ascoli turns to historical data for a guide, and on the threshold of that investigation writes these scholarly words:—

> We shall see in this investigation how vain . . . are the expectations of those who hope to see all comparative grammar reduced to a series of synoptical tables containing simple and exclusive equations which will enable us to make an easy progress, through a simple mechanism of alphabetic harmonies, across all times and countries, up to the primitive forms. All the pathological phenomena, from the very nature of them and because they imperfectly coincide with the general phases, must be vigorously excluded from this magic picture,* [of alphabetical harmonies.]

In other words, exact linguistic knowledge fails precisely at the point where history asks aid, and the two sister-knowledges mournfully cry for help to each other at the same point in human progress. The problem being to account for pathological facts, for changes suffered by a sound, and thence to draw a safe theory of etymological changes in derivations, we must take account of the fact that the Aryan tongues are mixed in India with Dravidic dialects. First theory: The Dravidic is the aboriginal tongue; Aryan peoples conquered Northern and Central India. This theory is supported by some facts of literature and history; enough to justify us in tentatively accepting it, not enough to found upon with entire certainty—it will not do to forget that the theory is tentative. Second theory: A class of changes in Aryan, not otherwise explicable, must be due to the contact of the two tongues (Dravidic and Aryan) in the region occupied simultaneously by both. Professor Ascoli admits that, despite this theory, the pillars of Hercules are before him. Every thing like chronology is excluded from the examination unless we are willing to work upon Mosaic data. With that we lack precision, but are assigned serviceable

* The translation is not literal, but faithfully preserves the thought of the Milanese scholar. (See *Corsi di Glottologia*, § 41.)

limits within which to search. The theory of indefinite time is unfathomable and yields no ore. We are compelled, in the next place, to compare living Dravidic with dead Aryan forms. Had we the dead Dravidic we could attain some accuracy, perhaps; but the *popular* speech that survives cannot be taken for the popular speech of four thousand years ago. It must be remembered, too, that it is not a case of Ariovistus receiving, not giving, hostages; for Aryan must have modified Dravidic in the process of receiving modifications. What, then, if the very facts of coincidence were the result of Aryan influence upon Dravidic? What is it that authorizes us to assume that the Dravidic sounds stood, before the Aryans came, as they now stand thousands of years later? It is an effort to measure the unseen shadow of one moving cloud by that of another projected from the same skies a thousand years later. One part of the theory is perfectly sound, that which assigns pathological facts to contacts with other tongues, and when history has told us what these tongues were we can *know;* till then we must be content, and the scholars are content, to *search*, following every lead of hypothesis and fainting not, however many may yield no precious ores. Indeed, none can be altogether empty; and the small dust swept together will make ingots of precious gold. The evil is that the scholar's hypothesis is the rhetor's truth; Ascoli guesses, and pursues his guess with a temperate enthusiasm. Some careless rhetor calls the guess a discovery, and boils over with excess of heat. It would be well if rhetors and theorists would leave linguistic scholars to complete their tasks in peace; and we may all take it for granted that discovering the foundations of human history is not the office of this branch of research.

It has been carelessly assumed that the interjectional and imitative theory of the origin of language opens a vast depth of time under the growth of speech. It is pure assumption. If we know any thing about imitative processes in sounds, we know that they defy all theories of a rate of progress. The process is now going on, and has always been going on, in a narrow region of speech. Supposing that from that narrow base all the rest has sprung, we cannot guess how long the distance may be between an imitation of a cry and the loss of all notion of imitation in the modified word. If Tennyson still

writes "clouds did *transe* the sky," and the word *trance* takes hold on Latin uses of *transire* to mean death—the old literal and the more modern refined use subsisting side by side—what law of progress from material to intellectual meanings can we hope to discover? If this movement is so subtle, how can we hope to make a time-space between an imitative sound and a derivative of it that has no hint of imitation? But in point of fact, the imitative theory is only an ingenious hypothesis, incapable of demonstrative proof, or of those rational inferences which are often accepted in place of demonstration. It cannot be said that it accounts for all the facts; it might be stretched to account for a hundredth part of them, but other facts reject the explanation. At some early period men began to use devices in their speech. They distinguished different meanings by variations in musical accent, by graduated vowels, by consonantal change. The slender capacities of imitation would cease to be relied upon when the devices of the intellect began to be used, and all existing non-imitative language probably sprung from these devices. It is only conjecture that imitation ever sufficed one generation of our ancestors; it is as reasonable to believe that imitation is now just what it always has been—that is, one only of the modes in which men convey their impressions. We must go outside of language for a basis of the imitative theory. A theorist draws out upon a time-chart a set of ages of stone, iron, bronze—a scheme of human arts—and infers that the speech of his first men was a meager set of cries because he has arbitrarily endowed them with an imperfect and obstructed intellectual activity. His "ages" are fanciful creations, and his notions about the intellectual caliber of early men are simply gratuitous. If one chooses to believe him, there is no law against such a mighty exercise of faith; but none of the facts lend the least support to the theory. At last it is a question of the "smartness" of Adam and his children. Assuming that they had no experience, how bright, quick, inventive, were they? The primeval man of an immeasurable antiquity is a dreadfully dull and slow fellow, and his antiquity rests upon that assumption about his intellect. Nothing that we know authorizes us to teach that generation after generation passed away before any of the devices of the brain entered into the forma-

tion of words. Just so soon as one device—a vowel variation, for example, (as *ba*, *bo*, *bu*)—had been, however accidentally, invented, it would naturally expand in use. Other devices, when hit upon, would also grow. The vowel device *seems* about as easily formed as the imitative one. Indeed, imitation *would produce vowel change*, and even a dull brain would probably notice it very soon. It should be noticed that a "smart" man at last turns up in these everlasting-growth theories. A Cadmus must be had. Will any one suggest a reason, based on lingual facts, for waiting ten thousand or fifty thousand years for him? There is absolutely nothing in language to suggest an indefinite, but vastly long, age of men too obtuse of ear to notice the variation of natural sounds, and too slow of invention to use vowel variation. We should reject the imitative theory, except as a possible first lesson in sounds; it is not the base under existing human speech—this rises upon a simple set of devices fabricated out of the simplest capacities of the voice.

Much higher up, language is a question of intellectual culture. The speech of Milton never exists among savages—they have no use for it. The law may be reasonably extended to the earliest times—in fact, theorists unconsciously apply this law to primeval life. A miserable, degraded, dull-eyed, and thick-headed autochthon needs only to bawl and screech. But be good enough to admit that even such an autochthon would notice the difference between bawling and screeching, and that when he had, however unconsciously, noted the difference, he would screech for one purpose and bawl for another. His first lesson in imitation would in this process be transformed into the use of a vocal device—the brain of this imaginary autochthon would have taken charge of the speech-making process. Who shall prove that early men were such autochthons? Who shall prove that they could not tell the difference between bawling and screeching? Who shall make us certain that their growth, keeping pace with their needs, did not produce *all* the intellectual devices which lie at the base of simple words?*

* The student may profitably consult "Lessons from Nature," by St. George Mivart, chapter iv, and Mr. Tylor's "Primitive Culture." I am not aware, however, that any writer has made before me the point that imitative language must have been in man a schoolmaster in vocal devices.

Art. II.—RECENT ORIGIN OF MAN.

[SECOND ARTICLE.]

The Recent Origin of Man, as Illustrated by Geology and the Modern Science of Prehistoric Archæology. By JAMES C. SOUTHALL. Philadelphia: J. B. Lippincott & Co. London: Trübner & Co. 1875.

The Mammoth.

CHAPTER XX is devoted to a great number of interesting facts about the mammoth, showing its comparatively recent date. Mr. Prestwick, the celebrated English authority, though still desirous to keep up a high antiquity for man, says: "I do not, for my part, see any geological reasons why the extinct mammalia should not have lived down to comparatively recent times, possibly not farther back than eight or ten thousand years." And in another place he remarks, that "the evidence seemed to me as much to necessitate the bringing forward of the great extinct animals toward our time, as the carrying back of man in geological time."

Mr. Southall has gathered in chapter xx a large collection of facts about the relations of extinct animals in general, and the mammoth in particular, to historic times. He copies from the Smithsonian works the sketch of the big Elephant Mound of Grant County, Wis., which seems to show that the mound builders had a knowledge in some way either of the elephant, the mastodon, or the tapir. Some of the discoveries detailed, though appearing in reputable scientific publications, are distrusted or discredited by scientific men. The connection of human and mastodon relics near Charleston, S. C., is one case. The deposits here are so thin and superficial that it is very difficult to be sure that there is no mixture of different ages, the more so, as the bones of the ordinary ox and the domestic hog are found also, neither of which were ever indigenous to this continent, and must, therefore, be specimens introduced by the modern settlers.

Mr. Southall, in common with many others, quotes the alleged discovery of human relics in Missouri, by Dr. Kock, when he exhumed the great mastodon now in the British Museum, and whose account of finding the bones, and the flint arrowhead *under one of them*, is current among European scientists as good authority. It has long been known to western

scientific men that Dr. Kock, through a good collector of specimens, was grossly ignorant of strict science, and, what is worse, utterly reckless of truth in his statements. The ground where he found the skeleton is totally different from what he stated; the thirteen or fourteen feet of different strata described, as overlying the skeleton, have no existence whatever, it being found close to the surface in swamp muck. The men who assisted him in exhuming it say the pit was not drained nor bailed out; but they worked up to their waists in water, groping at the bottom for the bones in such a way as to give no chance to know whether an arrowhead belonged to the time of the bones, or fell in while working.

More recently the "American Journal of Science" has analized Koch's pamphlets, and exposed their recklessness and ignorance. Professor Hoy, of Wisconsin, years ago exposed the falsity of the statements before the Chicago Academy of Science. Mr. Southall seems inclined to think that the mammoth survived later than the Pluvial Period, which may be true in some regions. One of the most singular discoveries bearing on this point is detailed in chapter xxxiv, taken from M. Desor's account of Siberian antiquities in the *Matèriaux pour l'Histoire de l'Homme*, 1873. The relics

Consist of a number of articles in bronze obtained by a Russian engineer, M. Lapatine, from the Tartars in the neighborhood of Krasnojarsk, on the southern frontier of Siberia. The objects mentioned are two poniards, two hatchets, six knives, a pair of scissors, a file, a bridle bit, and five buckles. Most of these articles are coated with a beautiful brown patina; others are covered with a green patina, similar to that observed on the antiquities found in the ancient European tombs. Their antiquity, we are told, is beyond question. They are far superior to, and entirely different from, the utensils and weapons in use among the Tartars; they have nothing in common with the classic forms, nor with those of the prehistoric epochs of Europe; nor are they Chinese nor Hindu. That they are the product of an indigenous civilization seems to be confirmed by the tombs, which are found in great numbers on the banks of the Yenisei, and which Pallas refers to an ancient people no longer in existence, but whose culture is attested by a funeral *mobilier* quite complete, which is composed in part of the same objects as those under consideration.

After stating that many of these bronzes represent very elegantly various animals, as the fox, eagle, etc., Mr. Southall

gives good engravings of them, and calls attention to one which appears to represent the Siberian mammoth. Mr. Southall is confident of the representation; but M. Desor, apparently staggered by the idea of a mammoth in the Bronze Period, while he acknowledges the resemblance, is disposed to think it accidental, and that the image represents only a freak of the artist's fancy. It certainly looks far more like a real mammoth than the tangled set of scratches found on a fragment of tusk in a European cave, and generally accepted as a contemporary picture of the animal. M. Desor thinks that the civilization shown by these bronzes was too elevated to exist in the present Siberian climate, and brings geological facts to prove that the great lowland regions must have been submerged, in which case "the northern slope of the Altai would enjoy a much more temperate climate." M. Desor puts in the invariable French proviso that this submergence must be "slow," but without adducing any proof of the slowness. Mr. Southall brings the following facts to show the submergence and its rapidity.

M. Dupont, of Belgium, adverting to the strange association in quaternary Europe of species characteristic both of cold and warmer climates, for instance, the reindeer and the hippopotamus, says that the hippopotamus proves the absence of cold winters, and the northern species show equally the absence of hot summers; in other words, the climate was much more equable than now; "but," continues M. Dupont, "it is the north-east wind which brings the cold in winter and the heat in summer, a double effect of a great plain in that direction. It is necessary, then, to seek the explanation of the climate of the quaternary epoch in the absence of those lands, and *the presence of a great sea to the north-east of Europe.*"

Ermann, in his "Travels in Siberia," says:

> The ground in Yakutsk, the internal condition of which was found in sinking M. Shergin's well, consists, to the depth of at least one hundred feet, of strata of loam, fine sand, and magnetic sand. They have been deposited from waters which at one time, *and it may be presumed suddenly*, overflowed the whole country as far as the Polar Sea. In these deepest strata are found twigs, rocks, and leaves of trees of the birch and willow kinds. Everywhere throughout these immense alluvial deposits are now lying the bones of antediluvian quadrupeds along with vegetable

remains. In the lower valley of the Lena . . . and at both sides of the mouth of this river, are found the teeth and bones of mammoths, rhinoceroses, and other quadrupeds, and even whole carcases . . . As we go nearer to the coast the deposits of wood below the earth, and also the deposit of bones which accompany the wood, increase in extent and frequency. Here, beneath the soil of Yakutsk, the trunks of birch-trees lie scattered only singly; but, on the other hand, they form such great and well-stored strata under the tundras, between the Lena and the Indigirka, that the Yukogirs never think of using any other fuel than fossil wood. . . . In the same proportion the search for ivory grows continually more certain and productive from the banks of the lakes in the interior to the hills along the coast of the Icy Sea. Both these kindred phenomena attain the greatest extent and importance at the farthest chain of islands above mentioned, which are separated from the coast by a strait about one hundred and fifty miles wide, of very moderate depth. Thus in New Siberia lie hills two hundred and fifty or three hundred feet high, formed of drift wood. . . . Other hills on the same island, and on Kotélnoi, are heaped up to an equal height with skeletons of pachyderms, bisons, etc., which are cemented together by frozen sand, as well as by strata of ice. It is only in the lower strata of the New Siberian wood-hills that the trunks have that position which they would assume in swimming or sinking undisturbed. On the summit of the hills they lie flung upon one another in the wildest disorder, forced upright in spite of gravitation, and with their tops broken off, or crushed, as if they had been thrown with great violence from the south on a bank and then heaped up. Now a smooth sea, covering the tops of these hills on the islands, would, even with the present form of the interjacent ground, extend to Yakutsk, which is but two hundred and seventy feet above the sea. But before the latest deposits of mud and sand had settled down, and had raised the ground more than one hundred feet, the surface of such a sea as we have supposed would have reached much farther up, even to the cliffs in the valley of the Lena. So it is clear that at the time when the elephants and trunks of trees were heaped up together, one flood extended from the center of the continent to the farthest barrier existing in the sea as it now is.

Recent Changes in Physical Geography.

The discussion of this subject is rendered necessary to Mr. Southall's purpose by the fact that many writers on human antiquity constantly assume that every little physical change on the surface of the globe requires a prodigious time for its accomplishment. Fifty years ago it was the fashion to attribute many geological changes to great and rapid convulsions of nature, or "catastrophes," as they were called. Sir Charles

Lyell fought a successful battle against the "catastrophists," and showed that many of these changes were better accounted for by more moderate forces, acting through long periods of time. From the time of this victory Sir Charles was disposed to carry his idea to excess, and to require enormous periods of time to be accepted in almost all circumstances as a substitute for force. When the claims for a great human antiquity arose, these long periods were found to be magnificent supports to the theories of such antiquity, and accordingly their authors have adopted a set of phrases, which have become almost a scientific cant, to express their opinion. At every recital of a denudation, or submergence, or silting up, or an upheaval, they almost invariably prefix the adjective "slow," or the phrase "inconceivably slow," often without giving a particle of proof of the supposed slowness; and throw in a liberal supply of exclamations, such as "What an enormous antiquity!" in discussions where no great lapse of time has been shown. This unscientific looseness and ready assumption is becoming tiresome, and it is none the less reprehensible because indulged in by some very eminent men. We want more facts and fewer conjectures. As Mr. Southall says:—

> It is assumed that it is unphilosophical to admit any more violent energies than those which existing operations present. It is assumed that the glacial epoch is separated from our days by a vast cycle of time; it is assumed that the physical geography of the earth has not been substantially modified for tens, or hundreds, or thousands of years; it is assumed that it requires long ages to effect the extinction of a fauna; it is assumed that elevations and subsidences of land have occurred at the rate of two and a half feet in a century; it is assumed that the rivers of to-day are the same streams with the same volume of water which existed at the close of the glacial period; it is assumed that it requires the sequence of innumerable centuries to effect a transition from a harsh to a temperate climate; it is assumed that because no great river-horses, or huge proboscisticus, or powerful carnivores, roam in our age through civilized Europe, a long and protracted period must have intervened since the hippopotamus wallowed in the marshes of the Thames, and the cave lion roared on the Mendip Hills.

There is, perhaps, some excuse for the proneness to these and other assumptions among European minds. When a man, inured from birth to the elaborate and refined civilization of

England and France, digs up a flint arrowhead or a rotten canoe, he gets a glimpse of a mode of life so different from any thing in the range of his experience, that he feels as though no figures could exaggerate the greatness of its antiquity. The American is in different circumstances. We have been shot at with flint arrowheads, and have paddled hundreds of miles through the forests in aboriginal canoes. These things are familiar to us, and we can only smile at the assumption that they necessarily belong to the dim ages which vanished a million years ago. In respect to physical geography, a large portion of the changes known to history have been rapid. Mr. Southall says:—

> According to Chinese and Japanese accounts, several volcanoes have risen from the bed of the sea on the coasts of Japan and Corea during the historical period. In the year 1007 a roar of thunder announced the appearance of the volcano of Toinmoura on the south of Corea, and after seven days a mountain four leagues in circumference appeared, towering up to the height of one thousand feet. The Japanese affirm that the celebrated Fusi Yama, the highest mountain in Japan, was upheaved in a single night from the sea twenty-one centuries and a half ago. In the Santorin group of the Ægean Sea quite a number of new islands have been upheaved in the historic period, one of them as lately as 1867.

In 1819 a great earthquake occurred in Hindostan. The village and British part of Sindree were permanently submerged, together with two thousand square miles of territory. At last accounts only some of the highest points of the masonry projected above the waves. Another piece of territory fifty miles long was by the same earthquake elevated some ten feet. The natives at the place, when they observed the elevation, gave it the name of *Ullah Bund*, the Mound of God. Still more recently another, a large area in that region, appears to have sunk, and another to have been elevated, converting Sindree Lake into a salt marsh. (Lyell.) In the year 1812 a tremendous series of earthquakes, continuing for weeks or months, occurred in the region around New Madrid on the Mississippi. A change of level was effected so suddenly that at one place the river for a little while reversed its course, and ran up stream. Lakes twenty miles long were formed in an hour, and a region seventy-five miles long and thirty miles

wide is now known as the Sunk Country. In the years 1826 and 1827 a succession of earthquakes so changed the level of the land along a coast in New Zealand that the sealers could no longer recognize the locality; and a hull of a vessel, supposed to be the "Active," lost some thirty years previously, was found two hundred yards inland, with a tree growing through its bottom. (Lyell.) At another earthquake in the same group, in 1855, a tract of land equal to four thousand square miles is believed to have been raised from one to nine feet.

In 1772 the volcano Papandayang, in the island of Java, had a great eruption, by which its summit sunk, or lost in some way four thousand feet of its height.

The famous earthquake in Lisbon is well known, by which prodigious physical effects were suddenly produced. Sixty thousand persons were destroyed in six minutes, the quay of the city sunk into an almost fathomless abyss, and the shock was felt from North America to Sweden. In Peru, in 1746, a tremendous earthquake destroyed Lima, and sunk a part of the coast of Callas, so as to convert it into a bay. On the Scandinavian coasts raised beaches occur whose history shows that *if the elevation was uniform* it occurred at the rate of two and a half feet in a century.

Sir Charles Lyell assumes that is to be reckoned as uniform; and some distinguished geologists have even taken that as a general measure of continental elevation, by which they might calculate the rates of submergence and emergence of other regions. Now at the time this estimate was made there was no evidence to show whether the rise had been uniform or not; the "uniformitarian" hypothesis was a sheer assumption, the only thing known being that certain points long ago known to be lower are now found higher. More recently a Norwegian geologist, from careful examination of the coast, declares that the elevation took place by comparatively rapid successive movements separated by intervals of rest or of slower action. It is well known, also, that the movement was very much greater at some points than others. Ermann mentions ("Travels in Siberia") that a lake near the Ural sunk two hundred and ninety-one feet between 1795 and 1812. The raised beach on the Frith of Forth, in Scotland, has risen about twenty-six feet since the time of the Romans. If this were

uniform, the motion would be about nineteen inches in a century; but observations since 1810 show elevations which, if uniform, are at the rate of four feet and a half in a century. The Hydrographic Office at Washington publishes a notice that the Gulf Stream islands, discovered in the Arctic seas, near Nova Zembla, in 1872, are on the spot where the Dutch navigators found a sand bank under one hundred and eight feet of water three hundred years ago.

Mr. Southall in this chapter details a great number of other physical changes occurring in the surface of the earth during historical times, but it is not necessary to recapitulate them. Lyell and his followers, in their contest against the "catastrophists," naturally reacted to an opposite extreme, and tried to exclude rapidly-acting forces almost entirely from geology. A candid examination of the facts adduced by Mr. Southall shows that this extreme is as unscientific as the one it superseded. The great problems of geology will never be successfully solved by such easy patent methods. Some changes have been produced by moderate causes acting through long periods of time, but it is now clear that others have resulted from forces acting with unusual energy in much shorter periods. The difficult task is, therefore, imposed on scientific men of distinguishing one from the other, and combining time and force in such a way as to give a true history. We must work patiently through these perplexing investigations, and in the mean time be more careful not to announce crude, ill-digested conclusions.

Relations of Stone, Bronze, and Iron.

Chapter xxiii is devoted to the above topic. Mr. Southall admits that particular tribes have used stone before bronze, and bronze before iron; but he denies that any general division of *past time* into three ages of stone, bronze, and iron can correctly be made. Some tribes are in the Stone Age now, and many others are using stone and iron at the same time. Even in Western Europe, where this distinction is chiefly applied, the Bronze Age is often absent, and, when present, generally the bronze and stone implements were used together, while it is also clear that long after iron was introduced stone implements were still common. In a general way it is true that

stone is earlier than bronze, and bronze than iron; but they are very much mixed, and sometimes inverted, as in the ruins of Troy, where Schliemann found a Stone Age later than bronze and iron both. A similar mixture was found in Mexico and Peru, whose inhabitants used both bronze and stone habitually, and a bronze cell was found in one of the oldest Egyptian pyramids; while flint implements were found in European dlolmens and *tumuli*, dating as late as the fourth and fifth centuries. The Chinese annals show that stone weapons were used in that country at least as late as between A. D. 964 and 1279. Stone axes, (chi-fon,) stone knives, (chi-t'ao,) a stone sword, (chi-kien,) and a stone agricultural implement, (chi-jin,) are also mentioned.

In the ancient monarchies of the valley of the Euphrates the metals were well known. Rawlinson says ("Five Great Monarchies," vol. i, pp. 119, 120) that in the very first age of Babylonia a civilized people used stone and metallic implements together. "In the Chaldean plain the tombs and ruins have yielded knives, hatchets, arrowheads, and other implements both of flint and bronze . . . chains, nails, fish-hooks, etc., of the same metal . . . leaden pipes, and jars, . . . armlets, bracelets, and finger-rings of iron." * Under the great stone bulls of Nineveh, which had never before been disturbed, Mr. Place found knives of black flint, along with "bracelets and necklaces of carnelian, emerald, amethyst, and other hard stones polished and fashioned in the shape of beads, and the heads of animals." †

The Ethiopians of the Upper Nile in the time of Xerxes had attained a high civilization, yet their contingent to Xerxes's army used stone arrow-points and horn javelin-heads, a striking case of flint implements being used while bronze and iron were well known: the Stone, Bronze, and Iron Ages all together:—

In the magnificent tomb discovered near the ancient Panticapæum, in the Tauric Chersonese, the flint implements again appear. The tomb found under a burial mound (*tumulus*) one hundred and sixty-five feet in diameter belonged to one of the early kings. It contained a shield of gold, a gilded quiver, a

* Smith's "Ancient History of the East," p. 375.

† *Congrès d'Anthropologie et d'Archéol.*, 1867, p. 118.

sword with a curiously embossed hilt, metal knives with carved ivory handles, statuettes, bronze cauldrons, and a hundred and twenty pounds' weight of gold jewelry.

Rosallini, the companion of Champollion and other explorers, stated long ago that knives and other articles of flint have repeatedly been found in the tombs by the side of the Egyptian mummies. At the meeting of the *Institut Egyptian*, May 19, 1870, M. Mariette Bey expressed himself as follows:—

> The fact that there are found (in Egypt) flints worked by the hand of man cannot be contested. . . . The flints in question do not go back to the age of stone. They belong to the historic age of Egypt. . . . In all historic antiquity, even to the time of the Ptolemies, flints were worked on this plateau. . . . With the flints they made knife-blades, which they fixed in handles of wood. One finds them even among the Greeks. These knives are sometimes toothed in the form of a saw. In the third place they made lance-heads.

In Abyssinia the Bogos still use both flint and iron for implements. M. Leemans says that an ancient Buddhist temple in Java, which was erected about A. D. 700, has its walls covered with bass-reliefs. These beautiful sculptures show perforated flint implements with wooden handles, and pile dwellings. Herodotus says that the Scythians east of the Caspian, at the time they defeated Cyrus, used gold and brass freely about their weapons and armor; but "they use neither iron nor silver, which, indeed, their country does not produce." According to this the eastern Scythians were in the Bronze Age, when Cyrus was in the Iron Epoch.

These are specimens of the facts adduced. Mr. Southall has given numerous others, and they show conclusively the extensive use of stone with both bronze and iron, not only down to the Middle Ages, but even to our day.

Possibly some future archæologist will puzzle himself over the millions of gun-flints used and lost by all armies fifty years ago. There has been an inexcusable flippancy and carelessness in assuming too sharp a distinction between the Stone and Metal Ages, and in assigning a locality, often imperfectly explored, to one or the other age, according to whether the excavators happened or not to light on any remaining pieces of

metal. The use of metals probably goes in some regions, back of the great deluge of the *loess* and *Terre a Brique*, into the Palæolithic Period, and has continued ever since. It is inconceivable how nations of prodigious antiquity came to be so firmly attached to the use of stone.

Mr. Southall has done an important service in this chapter in showing that extensive work in hewn stone implies the possession of metallic tools, and that tribes using stone only never execute them. It is possible that he carries the application of the principle too far, however, as it is clear to any one acquainted with the soft coral rocks, and porous, frothy lavas existing in many Pacific islands, where stone works exist, that there would be no insuperable difficulty in splitting and hammer-dressing these friable blocks with wooden wedges and stone hammers. The statement that the coral blocks in Tahiti were "polished" must be inaccurate, as coral rocks are all porous, and do not admit of polish. It is said, however, that an ancient extensive work of great blocks of hewn stone exist near Hilo, on Hawaii, and that the material was a "*dark, vitreous basalt*, faced and polished on every side."

There seems to be reason to doubt these assertions. Basalt is not "vitreous." Professor H. M. Lyman, of Chicago, is a native of Hawaii, and visited the ruins. He says he thinks the blocks are not basaltic, but lavas of other kinds, worked without iron tools, which he thinks quite practicable. Dr. S. L. Andrews, of Romeo, Mich., and for many years a missionary on Hawaii, says that the chiefs of the islands positively had large blocks of lava worked out by the natives with stone tools and an oppressive exaction of labor. The lavas are frequently fissured in such a way as to admit of blocks being got out without iron, and their vesicular friable character allows of hammer-dressing into almost any form.

Ruins of Troy.

Our author calls attention to the fact that Dr. Schliemann's discoveries in ancient Troy show a history completely subversive of the theory that a stone age must be considered always older than one of metal. Down at the lowest stratum was a city believed to be older than the Troy of Homer. Here

were evidences of wealth and civilization, with a mixture of bronze and stone implements. Above this was the Homeric city of classical fame. Here were all the evidences of still greater wealth and power, with abundance of gold, bronze, copper, elegant pottery, etc., together with many stone weapons. It will be remembered also in this connection that the Homeric poems speak of iron. Above this there was a stratum where the relics are ruder and poorer, and the inhabitants, though more modern than the Trojans, left no metal at all, the implements being purely of stone and other non-metallic substances. The next stratum shows stone implements also, and metal again appears. Finally, above all are the modern deposits, where relics of all sorts occur. We see therefore, then, at Troy a stone age succeeded to a luxurious age of gold and bronze.

In chapters xxi and xxii the author discusses the absence of Palæolithic remains from Egypt, as well as from the north of England, Scotland, Ireland, Denmark, Norway, and Sweden.

There appears to have been no Palæolithic Period among the inhabitants of Egypt. M. Delanoüe, however, thinks he found evidence of such a period in a local river terrace on a hillock at Fatira, thirty meters above the recent floods of the Nile. The fact that there was a beautiful instrument of polished flint among the relics would seem, however, by ordinary rules, to place them in the Neolithic stage of life. The height above the modern waters has led M. Delanoüe to think that an enormous period must have elapsed to cut down the river valley since that day so as to lower the flood level thirty meters. The facts are these: In ancient historic times the rock barrier, which in some places stretched across the valley, obstructed the flow at inundation times sufficiently to make temporary lakes. Pharaoh Amenemes III., and other kings of the twelfth dynasty, left records of the flood levels on the rocks, showing a lowering of twenty-seven feet since their time. It must be remembered that when the barrier was higher, and the rush of water swifter down the slope, the cutting would be more rapid, for the erosive action of rivers, according to engineers, is in proportion to the velocity. At this rate of erosion, the time of the higher level water could never reach back a tenth part of the time supposed necessary by anthropologists to touch the Palæo-

ithic Age. It is well known that streams which, like the Nile, carry a large amount of fine, gritty sediment, rasp away projecting rocks in their course much more rapidly than clear-water streams. Any traveler in the Alps may verify this by comparing the great depth of rock cutting effected by the muddy streams issuing from glaciers, with the shallow depressions made by brooks collected from spring water. Another point is to be considered. Most oriental travelers are of the opinion that the rainfall there, even as late as two or three thousand years ago, was much greater than now. If this was true of the Nile, the fact would account both for the water being higher than now with a given amount of obstruction, and would cause a more rapid rasping down of the barrier itself, for, according to civil engineers, the rapidity of erosion of a river bottom is directly as the depth of the water.

Mr. Southall is, therefore, clearly of the opinion that there was no proper Palæolithic Period among the Egyptians, though they made stone implements, and often rude ones, even down to the Ptolemaic Age. The reason of this absence of a proper Palæolithic stage, Mr. Southall finds in the probability that the very first immigrants into the valley of the lower Nile were civilized men.

The Peat Mosses.

The peat of the Somme was discussed in the chapter on the ethnology of that valley. The other parts of Europe are also very interesting, and have furnished an important series of facts and relics. Among the best studied are the peat beds of Denmark. These occupy hollows in the surface of the Bowlder Drift, and no Palæolithic remains are found in them. They are considered by archæologists to reach nearly or quite back to the beginning of the Neolithic Age. Mr. Hudson Tuttle thinks this peat is twenty-two thousand years of age; Sir Charles Lyell thinks that it may be sixteen thousand years; Steenstrup puts it at a *minimum* of four thousand; and Professor Worsade at not less than three thousand. As a matter of fact these calculations were based on no accurate *data*, and show their utter looseness by their contradictory results. The estimates of great antiquity rest on these facts. The lower parts of the peat beds contain trunks of Scotch fir, (*Pinus sylvestris*,) which has fallen in from the margin. This tree no longer grows in

Denmark. With the firs are found polished stone implements. Above the firs the peat contains oak logs, and with them very elegant and elaborate bronze articles occur, such as could hardly precede the Christian era. In the most modern peat beech logs and iron relics occur, and the beech is said to be superseding the oak in the country. The argument is that two changes in the prevailing timber imply great, and very slow, changes of climate. To Americans who have seen the pine swept out of regions equal to half a dozen Denmarks in half a life-time, the argument seems puerile; and even if the climate, and not the demands of the lumber trade, was the cause, we do not know that such a change requires any enormous antiquity. The data are too vague. Danish bronzes, similar to those of the peat bogs, are found in Ireland belonging to the period of the Danish invasion, A. D. 827; and there seems nothing tangible in these bogs to show an antiquity of more than three thousand years.

Marlot says the fir has not grown in Denmark in the Historic Period. This does not seem well proved, but amounts to nothing because the Historic Period in that peninsula does not reach back beyond the tenth century of our era. Cesar said this fir did not grow in England in his day, yet he was mistaken. Logs of it ninety feet long have been found in the peat with Roman remains, cut by the Roman general Ostorius in Vespasian's, reign. These relics were in Yorkshire. The Scotch fir, then, grew in England after Cesar's day, but is now only found north of the Scottish border. If this change occurred in England in less than eighteen hundred years, why should the same thing require fifteen or twenty thousand years in Den mark?

It is not easy to see why, in defiance of well-known facts, many archæologists so exaggerate the slowness of peat growth. Here are a few of the facts collected by Mr. Southall from various sources:—

There is on the Earl of Arran's estate, in Scotland, a primeval bog and forest, which makes it apparent that the pine, oak, and beech were not successive, but contemporaneous *at different levels;* the bog growing as well as the trees, (thus overtaking the upper species last.) Holes cut in the peat of this estate filled up at the rate of three inches a year.

Professor Worsaae says that woolen cloth was found with the aboriginal relics of the Danish peat. This shows commerce abroad, or the raising of sheep at home, at a time not probably enormously remote.

Where the Roman general Ostorius cut the forest of Scotch firs in Yorkshire, the Hatfield Moss has since grown over an area of ninety thousand acres. At the bottom of the peat, many feet down, Roman axes and knives, with the stumps of Scotch fir, oak, etc., etc., were found. Many of the trunks were hewn, bored, chopped, and split; and rails, wedges, bars, pieces of chain, horses' skulls, axes, and coins of the Roman emperors, were found.

In Kincardine Moss, Scotland, Roman coins, etc., were found, and also a Roman military road-bed of timber, over which eight feet of peat had accumulated. At Gröningen a coin of the Emperor Gordian, A. D. 237, was found under thirty feet of peat. In the Jura Mountains old iron furnaces are found, with Roman and Gallic coins of two thousand years or less of age. Over one of these furnaces twenty feet of peat had accumulated. In Derbyshire a grazier perished on a bog in a snow-storm. Twenty-eight years after his body was found three feet deep in the peat. In the "Natural History of Stafford" it is stated that coins of Edward IV. have been found eighteen feet down in the peat. Sir Charles Lyell states that at Lagore, in Ireland, relics of stone, bronze, and iron are found under fifteen feet of peat.

In the seventeenth century the Earl of Cromarty described to the Royal Society the origination of a new peat bog, which in less than fifty years covered up the trunks of trees fallen on it, and was thick enough to be cut for fuel.

From all these and many other facts, it is evident that the rate of peat growth is not slow enough to be a proof of any enormous period of human antiquity.

The Mud of the Mississippi.

The Mississippi River rolls to the Gulf of Mexico a mass of mud and sand of prodigious volume. General Humphrey, of the United States Army Engineers, while making the survey of the river, had elaborate observations kept up for a year at various points to determine the amount of this sediment. He

makes it equal to a stratum one foot in depth over an area of about two hundred and seventy square miles every year. The river annually cuts away great areas of its banks, and deposits immense tracts of mud and sand in other places.

Such rapid changes produce many interesting phenomena, and have led to various efforts to determine the antiquity of the deposits. In digging for the gas-works in New Orleans, the skeleton of a "Red Indian" was found, according to Dr. Dowler, at the depth of sixteen feet, and beneath four successive layers of cypress forest. Dr. Dowler endeavored to get an estimate of the general rate of mud accretion on the delta where New Orleans stands, and then assuming it to be both correct and uniform, estimated that it would require fifty-seven thousand years to deposit the sixteen feet of material above the skeleton. Lyell partly approves the calculation. Now General Humphrey, in his elaborate survey, came to the conclusion that the whole ground of New Orleans and the surrounding country, down to the depth of about forty feet, was only four thousand four hundred years old.

Mr. Fontaine, Mr. Hurlbut, and others, state that owing to the enormous rapidity with which the river changes its course, articles lost in the life-time of men now living are, in many places, buried one hundred feet deep. Dr. Andrews saw cottonwood saplings on the banks, with only seven rings of annual growth, over whose original roots the inundations had deposited three feet of clay. There are streets in New Orleans now where the water flowed a hundred feet deep sixty years ago. Mr. Fontaine gives an amusing statement that information reached the New Orleans Academy of Sciences that a piece of wood has been found at Port Jackson deeper down than Dr. Dowler's "Red Indian," and at a considerable distance from the river, and, moreover, showing workmanship by a high order of tools. Some members of the academy investigated the relic and found it to be the gunwale of a Kentucky flat-boat. Mr. F. remarks as follows on the action of the Mississippi River:—

> By undermining and engulfing its banks with every thing upon them, logs tangled in vines and bedded in mud, cypress stumps, Indian graves, and modern works of art, are suddenly swallowed up and buried at all depths by its waters, from ten to one hundred

and eighty-seven feet. The deep channel then works its way from them, and leaves them beneath a deep soil of inconceivable fertility, which quickly produces above them a dense forest.

The Mud of the Nile.

The Nile much resembles the Mississippi, both in its magnitude, in its great annual overflows, in its prodigious quantities of sediment, and in its disposition to erode its banks and precipitate into its abysses ancient and modern articles alike. Mr. Horner, indorsed to some extent by Sir John Lubbock, has fallen into Dr. Dowler's New Orleans blunder. That is to say, he assumes that when any article is found below the surface, it is purely because the general level of the valley has risen by that amount, by the gradual accretions of the sediment of the overflows. The calculation was as follows: Nine feet four inches of sediment have accumulated around the obelisk at Heliopolis and the statue of Rameses at Memphis. Now the obelisk "is believed" to be about four thousand one hundred and fifty years of age, and the statue of Rameses is thought to date from his reign, about three thousand two hundred years ago. Dividing the measure of the accretion by the number of years, Mr. Horner concludes that the rate of accretion has been about three and a half inches in a century. He also found a piece of pottery thirty-nine feet below the surface, and applying the three and a half inch century-measure to that depth, he concluded that the pottery "had been buried thirteen thousand years."

Mr. Horner seems to make no account of other monuments, as the temple of Dendereh, for example, where a much greater accretion has occurred in half the time, but falls headlong into the same trap with Dr. Dowler and the "Red Indian." A writer in the "London Quarterly Review" sets the whole thing in its true light, by calling attention to the fact that Sir Robert Stephenson found in the Delta, at Damietta, at a greater depth than was ever reached by Mr. Horner, a brick bearing upon it the stamp of Mehemet Ali. Mr. Saville also states that in the deepest boring at the foot of the statue of Rameses II. there was found pottery fancied to be "Palæolithic," but stamped with the Grecian honeysuckle. Mr. Horner and an Egyptian officer made over ninety excavations in two lines across the valley, and in most of them found frag-

ments of burnt brick at greater depths than the piece of pottery above mentioned. Now, as burnt bricks were rarely used in Egypt until the time of the Romans, it seems probable that most of these fragments do not antedate the beginning of commerce with Rome. The Romans, who possessed unlimited forests, could burn and ship bricks to Egypt, when the latter country, being destitute of timber, could not often afford the immense expense of fuel for the kilns. The "Anthropological Review," which has certainly no prejudice against long periods, pronounces Mr. Horner's evidence "preposterous," and thinks it is to be regretted that Sir Charles Lyell "should have thought it worth while to notice such absurdities."

The Cones of the Tinière.

This locality has been made the basis of another calculation, which, by the approval of Lyell, Lubbock, and the European archæologists generally, has become famous, and is much esteemed as a proof of human antiquity. As the statement is brief, and can scarcely be further condensed, we quote it entire from Mr. Southall:—

> At the eastern extremity of the Lake of Geneva, at the city of Villeneuve, the torrent of the Tinière descends abruptly from the mountains. It brings down annually a certain amount of gravel, which has been deposited in the form of a half-cone upon the plateau on the border of the lake. The apex of the cone rests against the side of the mountain, and the base extends in a semicircle around the mouth from which the torrent descends. A railroad cutting has exposed a section of one of the cones nearly to its base. Four feet from the top were found Roman relics, at ten feet were found bronze implements, and at nineteen feet Professor Marlot found stone implements. The entire depth of the cone is thirty-two feet six inches. Some two or three hundred years ago the increase of the cone was stopped by confining the torrent between stone walls. This leaves about fourteen hundred or fifteen hundred for the Roman period. In this time about four feet of gravel (as the calculation runs) were deposited, or about three and a half inches in a century. From this *datum* Marlot calculates that the antiquity of the bronze relics is about three thousand eight hundred years, that of the stone relics about six thousand four hundred years, and that of the whole cone about ten thousand years.

Dr. Andrews has demolished this calculation. He says, ("American Journal of Science," March, 1868:)—

It is with great hesitation that I question the conclusions of a European *savant*, made respecting his own country; but having twice examined these cones with great care, and followed the torrent a mile into the mountains to study its appearance and actions, I cannot avoid the conclusion that there is a very singular mathematical error in estimating the age of the cones, and an omission of several important geological facts, which vitiate the whole calculation. The nature of the mathematical error will be made obvious by a few facts. The gravel cones of Switzerland are very numerous, and the principle of their formation easily understood.

On the supposition that the torrent brings down about the same amount of gravel every year, it will readily be seen that the first year's deposit will be upon the plateau in a conical heap of no great breadth, but considerable height. The second year's gravel, however, will be spread over the entire surface of the first, and being wider, it must be much thinner. The third year's accretion will be broader and thinner still; and so on to the last. It follows that the superficial annual layers are always the thinnest, because the broadest. Now, if Marlot is correctly quoted, he first derives his scale of from three and three tenths to four inches' increase per century from the superficial layers where they are thinnest, and then applies it without modification to the interior, where the annual accretions are much thicker. His unit of measure is therefore too small, and exaggerates the total age. It is perfectly plain that the true method is to take the cubic contents of the strata, whose age is known, and compare the amount with the cubic contents of the whole cone; or, in plain language, if the annual rainfall and gravel wash has been uniform, then as the quantity of gravel in the layers deposited since the Roman conquest is to the quantity in the whole cone, so is the time required for the deposit of those layers to the time required for the formation of the whole cone.

The revised *data* and calculation would be as follows: Height of apex, 38 feet. Radius of base, 900 feet. Cubic feet in the strata deposited since the Roman conquest, 5,283,205. Time of deposition of the same, 1,300 to 1,500 years. Cubic feet in the whole cone, 16,116,408. Time of deposit of the same, 3,965 to 4,576 years. Adding the three hundred years which have elapsed since the deposit ceased, the present age of the lower cone would be from four thousand two hundred and sixty-five to four thousand eight hundred and seventy-six years. The whole cone is, therefore, at a *maximum*, only four thousand five hundred years old. The whole calculation would be still further changed if the gravel was arrested earlier than two hundred or three hundred years ago, or if the Roman coin found was dropped a couple of centuries later than has been assumed, or if, three thousand years ago, the torrent of the Tinière flowed with a bolder current than it did in the Middle Ages.

MM. de Ferry and Arcelin have made some calculations of the age of relics found in the deposits of the river Saône. From their *data* they obtain these results:—

	M. Arcelin's Calculation.	M. de Ferry's Calculation.
Celtic Iron Age.....	1,800 to 2,700 years.	.....
Bronze "	2,700 to 3,600 "	3,000 years.
Neolithic "	3,600 to 6,700 "	4,000 or 5,000 years.
Palæolithic "	6,700 to 8,000 "	9,000 or 10,000 "

We are not informed as to the faithfulness of these calculations, but they are corroborative of the corrected calculations of the Tinière, and present a striking contrast to the hundreds of thousands and millions of years loosely demanded by many archæologists.

The Recent Date of the Glacial Age.

Chapter xxxiii is devoted to the proof derived from the shores of Lake Michigan, that no enormous period has elapsed since the Glacial Drift of that region was deposited. The investigation sonth is subject are from the "Transactions of the Chicago Academy of Sciences," and were conducted by Professor Andrews. Professor Dawson, of Montreal, remarks of this investigation, that he knows of no calculation of this sort made with equal care either in this country or in Europe.

Lakes Michigan and Huron are hydrographically one sheet of water, being at the same level, and connected by a strait several miles in width. Lake Michigan is three hundred and fifty miles in length, and eighty-five miles in width. Its outlet is at the strait at the north end, the southern extremity being a *cul-de-sac.* Its waves are continually in motion, and rapidly erode the drift clay of its shores. The material washed down by the waves is sorted by the same agency into clay and sand. The clay, floating about, settles whenever it reaches deep water, where the wave-action is too slight to keep it longer suspended; while the sand is carried by certain currents (mapped in the article) along shore southward, and deposited in beaches and dunes on the low sloping plain around the south end of the lake. The beaches thus formed have mapped out on the surrounding country every successive level occupied by the waters, and show by their relative size the length of time during which each one was deposited; while the same periods farther north are indicated by the ancient bluffs from the erosion of which the sands of the beaches were derived. It is by the combined study of the erosion and of the beaches that the total post-glacial time can be deduced.

The elements of the calculation are the following: 1. The average rate of erosion. 2. The width of the subaqueous plateau formed by the erosion since the lake stood at its present level. 3. The amount and direction of the sand movement. 4. The amount of sand in the several beaches.

The lake lies in a basin of bowlder drift, and has existed ever since the close of the Drift Period. Without entering into the dispute between the advocates of the glacier and of the iceberg theories, it appears that in that region a submergence beneath the sea occurred either just at the close of the drift or else continued from the drift itself. This is shown by the fact that the bowlder drift contains a large amount of salt, and its waters are far more saline than either the lake above, or the artesian waters of the rock beneath, and also by the aqueous character of a thin stratum of orange-colored loam covering all the drift hills and valleys. These waters at the close of the period retired abruptly southward, pausing nowhere between the highlands of Wisconsin and the Ohio River long enough to throw up any beach outside of the lake basins. When we reflect that a single storm on the sea will sometimes throw up a beach which no time can obliterate, we see that this retirement which left no beach-lines must have been rapid, and that it marked in a precise and definite manner the close of the Drift Period. The basins of the lakes were left, of course, like huge cups full of water, whose waves from that hour began to erode their shores, and to map out their history on their slopes.

The waters of Lake Michigan have stood at three different levels, which are marked in the north by three bluffs cut at different heights on the shores; and in the region around the southern end of the lake, where the vast amounts of sand brought by the currents shields the shores from wash, the three shore-lines are accurately mapped out by sand beaches, which are on the same level as the bluffs with which they were severally contemporaneous.

Age of the Lower Beach.

The shores of Lake Michigan are nowhere stationary for long periods. The tearing down of the clay bluffs in the north, and the piling up of sand in the south under the tremendous dashing of the waves, goes on with an energy which is astonishing.

In the north, therefore, the shores are continually receding, and the waters encroaching on the land. The waves of the lake cease to have any erosive power upon the bottom at the depth of sixty feet, hence, where the shores have been worn back, there is left under water a sort of shelf, or terrace, the surface of which slopes gently outward to the depth of about sixty feet, when the bottom dips more suddenly downward below the depth of wave action. The outer edge of this terrace marks the place where sixty feet of water was when the erosion commenced, and gives a clue for finding the approximate position of the old shore line, now washed away. From a great number of observations, it appears that the total recession of the bluffs from the old shore line along the west coast amounts on the average to 2.72 miles, or fourteen thousand three hundred and sixty-two feet. Along this same coast a great number of observations and measurements show that the annual recession amounts on the average to about 5.28 feet per annum. Dividing the entire recession by this amount, we find the age of the lower terrace is two thousand seven hundred and twenty years. Taking fifty miles of the east coast of Lake Huron, (from Brewster's Mills to Point Clark,) the erosions have been less carefully studied, but still they corroborate in the main the other figures; for, dividing the width of the adjacent subaqueous terrace by the annual amount, we get for its age three thousand eight hundred and fifty-nine years.

Around the head of Lake Michigan the sand beaches take the place of the bluffs, and are necessarily of the same age. Soundings have shown that no sand passes out into deep water, nor does any come ashore from below sixty feet. It is all carried south, along both shores, by the two southward currents, till arrested in the *cul-de-sac*, where the currents meet. It is piled up in beaches, or blown by the winds into lofty dunes, often one hundred and sixty feet high. The lower beach is, of necessity, of the same antiquity as the lower terrace and bluff. This beach line contains about 1,747,570,000 cubic yards of sand, and, as before shown, is from twenty-seven hundred to thirty-eight hundred years of age. Above this beach, however, are two other lines of beaches and dunes, which represent the age of the upper bluffs, and

contain about 1,659,881,000 cubic yards of sand. It is obvious that we have here the elements of a proportion, and that as the amount of sand in the lower beach is to the total amount of sand, so is the time of accretion of the lower beach to the time of accretion of all the beaches, that is, the whole time from now back to the Drift Period. Carrying out the calculation, Dr. Andrews finds the time indicated to be between five thousand two hundred and ninety years, and seven thousand four hundred and ninety-one years.

The advantages of the shores of the Great Lakes for these estimates is, that they afford opportunities for numbers of independent calculations more or less complete, which can confirm or correct each other. Professor Andrews has introduced two or three such, showing the utter impossibility of allowing any such time as 100,000 years, so often claimed for the Post-glacial Period.

It is remarkable that the deposits on the shores of Lake Michigan show the same sequence of events as in Belgium, namely:—

1. Bowlder Drift. 2. First low-water period, (Palæolithic time,) mastodon and mammoth. 3. Great inundation, (lœss.) 4. Modern, or second low-water period. Thus far there are no relics of men found around Lake Michigan in the deposits of the first low-water period, which corresponds to the Palæolithic age of Europe. The mud of the great inundation, however, is clearly traceable, and covers over great quantities of vegetation and prostrate timber.

The Antiquity of Man in America.

In chapter xxxvi Mr. Southall takes up this subject with the following facts and testimonies: For the Red Indians no great antiquity is claimed by any one. Captain Dupaix, in his *Antiquités Mexicaines*, fancies that the ruined cities of Central America were antediluvian, but on what evidence does not appear. The Aztecs had a definite history, with dates of their arrival in Mexico, and founded their new capital A. D. 1326, beginning it first on piles in the lake, making it in fact a pile village. (Prescott's "Conquest of Mexico.")

The Toltecs entered the valley earlier, and had dates reaching back to A. D. 387. The dates in ancient Peruvian history

are less trustworthy than those found in Mexico. The earliest ones only reach to the twelfth century after Christ. The ancient Mexican histories state that their predecessors in the valley, namely, the Toltecs, came from "Old Tlapalan," an empire situated at a great distance to the north-east, where they were skilled in working stone and metals. They state that the journey was long, and that they settled at two intermediate points before finally arriving in the valley of Mexico. They were driven out of "Old Tlapalan," they state, after a struggle of thirteen years, by a combination of barbarous tribes called Chicmecs. "Old Tlapalan" was inland country, but on their migration they halted several years in a land near the sea. The close resemblance in the religion and civilization of the Mound Builders to that found by Cortes in the valley of Mexico, together with the direction and distance of the migration, leads to a probable conjecture that "Old Tlapalan" was the Mound Builders' country. The documentary dates of the native history fix this migration at about A. D. 700.

The old native chronicler, Ixtlilxochitl, "the best authority," says Prescott, "for the traditions of his country," reports that the new Toltec empire, after flourishing in the valley of Mexico, broke up again about the tenth century after Christ, and the fragments of the nation settled in Guatemala, Tehuantepec, and Central America generally. This corresponds to the location of the ruined cities before mentioned.

The Mound Builders.

In the region apparently called by these native histories "Old Tlapalan," that is, in the valleys of the Mississippi and of the great lakes, and in places lapping over upon the Atlantic slope, flourished the Mound Builders. They habitually buried their dead in mounds of earth. They constructed also mounds for worship, and probably kept up perpetual fires on their summits, like the Aztecs. In fact the Aztec temples were only mounds more developed, and cased in stone or adobe. Dr. Frank Richardson has found in the great mounds opposite St. Louis numerous burnt fragments of human bones, showing that the ancient city which worshiped there kept up the Aztec rites of frequent human sacrifice, and of feasting on the victims.

The Mound Builders were agriculturists, and lived in large settlements. They worked the copper veins of Lake Superior, but generally shaped the metal by hammering, and rarely by melting. Yet bronze chisels have been found, showing that the copper was sometimes melted and alloyed with tin. They had woven cloth, and probably lived in communal houses built of wood, and often elevated on large mounds, but at other times surrounded by a parapet of earth.

Mr. Squier, after investigating the mounds of New York, and comparing them probably with Central American remains, and studying them in connection with the habits and history of the Iroquois, (the Five Nations,) was brought unexpectedly to the conclusion that the New York mounds "were erected by the Iroquois, or their western neighbors, and do not possess any great antiquity."

If this is true, the Iroquois are a remnant of the true Mound Builders. It is commonly said that the modern Indians have no traditions of the mounds. This is not true. The Indians of Michigan, in some instances at least, had accounts of their occupation, and in one instance of a fortification mound being constructed for an emergency only two generations before by the tribe that had the tradition. In the South, the Natchez Indians were apparently living the Mound Builder's life when visited by La Salle in 1681. They also sacrificed human victims to the Sun, and used adobe walls, like the Mexicans. Bartram states that in his day the Choctaws built mounds over the bones of their dead; and Tomochichi pointed out a large conical mound in which he said the Yamacraw chief was interred, who many years before had entertained a great white man with a red beard, who entered the Savannah River in a large vessel. Mr. Charles C. Jones, in his "Antiquities of the Southern Indians," found in the bottom of a mound twenty feet in diameter and seven feet high an old-fashioned sword, (stated in the Smithsonian publications to be iron,) with an oak hilt. This shows evident communication with Europeans. It is agreed on all hands that no enormous antiquity can be assigned to the Mound Builders.

The aborigines of former days seem to have had communication with Asia. In Tennessee a bronze idol is figured, which, by good judges, is pronounced of Asiatic workmanship. At

twenty feet depth, in a shell-mound on the Pacific coast, a number of skeletons were found, one of which was a body wrapped in a long piece of red silk, which was prevented from decay by a coating of asphaltum.

We have already referred to the untrustworthy character of Dr. Koch's testimony, which renders it necessary to throw his statements entirely out of the account. Mr. Southall also effectually disposes of Dr. Dowler's Red Indian; and Col. Whittlesey's ancient Ohio Hearths, though doubtless honestly reported, are merely in river deposits, and subject to the same uncertainties of antiquity that pertain to the deposits of the Nile and the Mississippi.

The Natchez Pelvis.

Some notoriety has been given to a human pelvis found, along with bones of the mastodon, and megalonyx lying loose in a ravine near Natchez. The bluffs bordering the ravine are lœss. The trouble about this specimen is that the Indian graves at the tops of these bluffs are continually caving down, and mingling their relics with objects at the bottom. This class of specimens is notoriously uncertain, and no experienced scientist attaches any significance to them.

Skull from Calaveras County, California.

Some years ago two men took a finely developed Indian skull from a cave in the side of the valley, and placed it in a mining shaft, intending to have it fall into the hands of Professor Whitney as a practical joke. It was successful. A workman took out the skull and afterward gave it to the professor, who was so satisfied with the evidence of its authenticity that he neglected to have the shaft pumped out (it was full of water at the time of his visit) to examine the ground, and see whether the cave-stalagmite adhering to the skull could be accounted for on the supposition of its original lodgment in the gravel of the pit. He was effectually deceived, and believed the skull to be of Pliocene Age. A well-known and thoroughly reliable clergyman in California is brother to one of the men who placed the skull in the shaft, and testifies to the fact of the whole thing being a joke.

Other California Relics.

Although this specimen was not genuine, other human relics have been found, it is said, in the "pay dirt," or gravel, at the depth of one or two hundred feet below the top of Table Mountain. The mass of the "mountain" above the relics is the product of one or more prodigious volcanic eruptions, which filled up the original ravines and water-courses with lava, ashes, etc., so that the subsequent courses of the streams were in entirely new routes, and the old channels became gold mines under the hill, in the excavation of which the relics were found.

The cutting of deep new ravines in the lava and ashes since that day must have taken a considerable period, but there is nothing to show whether it was very long or otherwise. No measure of such action in such material exists by which we could determine, and, if the rainfall there was formerly greater than now, as many investigators think, the time might be very moderate. The volcanic deposit above the relics proves nothing. Existing volcanoes have ejected thicker masses than that in a single eruption. The minor proof of antiquity is this. Professor Whitney thinks that so great a volcanic disturbance in California may naturally be thought contemporaneous with the Bowlder Drift disturbances of the east, and hence reckons the volcanic deposit as the California representative of the Drift Period. Now, as the Pliocene Period was the one next preceding the Bowlder Drift, and as these relics are alleged to come from under the volcanic mass, he thinks they belong to the Pliocene Period, which would make them older than the Bowlder Drift, or any relics of man ever found elsewhere.

This whole argument is a begging of the question. Volcanic eruptions occur in all ages; but even if this is assumed, on account of its magnitude, to have a probable connection with disturbances elsewhere, it is as likely to have been at the time of the lœss as at that of the drift. The fauna found with them ought to have corrected the estimate. The bones of the mastadon and *elephas Americana* are found in the same deposit. Now these are not Pliocene animals, but belong to the period after the drift, and along with Palæolithic man. I should say, also, that torrent deposits present the same obstacles to safe

conclusions that other streams do, because they mix relics of all ages together. The ancient California men may possibly have been contemporary with the Palæolithic men of Belgium.

A fisherman's line-sinker, made of polished syenite, was found by workmen while sinking a well in San Joaquin. The workmen alleged that it came from the same quaternary gravel thirty feet down. If so, it may be Palæolithic in spite of its beautiful polish and finish. The authenticity of its location is not proved, however. No scientific man saw it exhumed, and every experienced naturalist knows how prone workmen are to confound the relics, which tumble into an excavation from the edge of the earth at the top, with those properly belonging to the bottom. The positiveness of their false opinions in these cases is often very amusing, and not unfrequently imposes on scientific men themselves. It is said similar stone sinkers are still used by the western coast Indians.

The work of Mr. Southall is a timely one. The archæologists have been industrious, and accumulated a large array of facts, which different observers, with a singular blundering eagerness, assume to prove all sorts of contradictory antiquities for the human race, varying from five thousand up to eight millions of years. It is time to examine their work, to sift and compare their discoveries, to blow among the dust and smoke of enthusiastic assumptions, and see exactly what the facts prove. Mr. Southall has done this in a masterly manner. As before stated, he has given the most thorough and honest statement of all the important discoveries on this subject which has ever appeared in the English language, and made it so complete that very few important facts have escaped him. At the same time he has brought to the work a keen, and often original, analysis, which greatly increases the value of the treatise. He has given a very great labor to it, and this is what is needed. Facts, and facts alone, settle such questions, and to them all appeals at last must come.

The final result of the whole discussion is clearly this. Up to the present hour there has not been found a fragment of any human bone, nor a single relic of human workmanship, which can be clearly shown to be over five thousand years of age.

Art. III.—THE SCIENTIFIC CONFERENCE AT CHAUTAUQUA.

At the late Sunday-school Assembly at Chautauqua, one of the highest functionaries of our Church declared its creative and controlling spirit, Dr. Vincent, to be the Napoleon of the Sunday-school cause. We are inclined to carry out the figure a step farther, and name him the Danton of the Sunday-school revolution—for in his work he seems to have adopted as his own the motto of the great French revolutionist, "*l'audace! l'audace!! et encore l'audace!!!*" for year after year he seems to increase in boldness and in boldness, and again in boldness, until we are at a loss to know what to expect from him next.

When this generalissimo of his revolution came to us for the first time to unfold his plans for a Scientific Conference at Chautauqua we listened with fear and trembling, and thought within us—this is a bold experiment. But the leader had determined on a forward movement, and only desired of us counsel as to the members of his staff for this aggressive warfare. We advised as best we knew, and could simply wish him Godspeed! And he sped to victory by a judicious choice of workers, and then commanded success to perch upon his banners by deserving it.

The Scientific Conference has ceased to be a doubtful experiment, and has passed into the field of history; and its decided success merits, we think, a chronicler, and as such we propose to enter into no philosophical disquisition as to the conflict between science and religion—with this we have been both saturated and satiated. We prefer to deal with the practical facts brought forward in this new enterprise, and to show how, in our humble judgment, the developments of the wonders revealed by science will lead the popular mind more surely to a firm belief in the existence of a great and good First Cause, and will leave an impression even stronger than the arguments of Bible defenders, and one that will be proof against the attacks of atheistic scientists.

This Scientific Conference fully proves that Christian men have no desire to refuse a hearing to the devotees of science; on the contrary, they are willing to do even more than "heard

the lion in his den;" they bid him come forth and take their platform with all that he has to reveal, that they may use it to demonstrate the goodness, power, and sublime glory of God. "Truth is mighty and will prevail," and no man ought to fear the development of any truth that can clearly be proved to be such; and so long as scientific men will bring us the actual and wonderful facts of science, and will spare us vague theories about matters in which they are as much in the dark as we, and especially will spare us many of their doubtful deductions, we shall willingly listen to them, and accept them as worthy and desirable coadjutors in the noble and praiseworthy effort to understand all that we may of the marvelous attributes of God.

The enigma to be solved was the feasibility and desirability of presenting scientific truths to Christian workers. Can it be done? Is it well to do it? Will they appreciate it and profit by it? We answer these questions in the affirmative, and are sustained, we believe, by the great majority of the persons who enjoyed the rare opportunity of studying scientific truth as it was presented at Chautauqua. And we shall endeavor to strengthen our position by a collateral approach in the first place.

Some years ago the scientific men of England, under the lead of Faraday, undertook to teach popular science to the poor, with the view of elevating and encouraging them to look to nobler things than the many allurements and vices around them. His Christmas lectures to juvenile audiences years ago may be considered as the inauguration of a system which finally grew into a regular preaching of the gospel of science to the poor. Since his death his successor, Professor Tyndall, has regularly continued these Christmas lectures. And the famous Manchester lectures to the workingmen have now grown into a fixed institution. The object was simply to teach the elements of science in plain and popular language, and to prove the truth of the many curious assertions by actual experiments. The system has become a decided success, and the working poor of England now enjoy great advantages in the study of applied science, though it may be imparted by some men who in a higher sphere have acquired no great credit for their frivolous and disrespectful treatment of the influence of a higher

Being in the affairs of man and the control of the world. These men have doubtless unwittingly taught many sublime and holy truths, that have been better appreciated by their lowly hearers than by themselves.

The success of these lectures has led scientific men to renounce the erroneous notion that has too long prevailed among them as to the value of such efforts. What the French call the *vulgarization* of knowledge is now becoming popular among them, and they are beginning to enjoy the pleasure of addressing unlettered and unwashed audiences, many of which seem to vie in intelligence with their better dressed and housed competitors, and to absorb, to their great profit, the sublime truths imparted to them. And we are pleased to say that the same experiment has been tried now for a few winters with very marked success in our own country by one of the Chautauqua workers in the Scientific Conference, Professor S. A. Lattimore, of the University of Rochester.

This gentleman conceived some years ago the idea of establishing in that city a course of free lectures for the workingmen with their wives and children, to present to them the wonders of science in plain and intelligible language, demonstrated by many of the beautiful experiments at his command with the apparatus used in his class lectures. This idea of giving the workingmen college lectures, so to say, was received at first with much distrust. Will these people come? And will it do them any good? Suffice it to say that they have been continued for several years in Rochester, have been extended by urgent request to Buffalo, and just now Detroit is endeavoring to secure the assistance of the same distinguished and philanthropic Christian gentleman for a course of his lectures in that city under the auspices of the Young Men's Christian Association. And he writes to us in a private letter, in reply to a request for his impressions regarding the work, as follows:—

"All I know is the little I have learned during the last few years in my humble efforts to do something for the working people of this city and Buffalo in the way of lectures on popular science. I began with no encouragement, but only discouragement, from my friends. The unexpected success at first might fairly have been attributed to the novelty of the

enterprise, and the fact that tickets were given away to any workingman free of cost, and no tickets were sold. But as the novelty wore off the interest seemed to increase, and I have always been surprised at the intelligent appearance and the wrapt attention of these great audiences. I have never seen any thing so inspiring and helpful to an extempore speaker. I have always insisted on a few conditions, such as these: All the workingmen (with wives and children, say over fourteen) to be admitted without distinction. Tickets to be free of cost, and other classes not admitted. Many workingmen object to receiving a free ticket, fearing they are accepting a charity. Sunday clothes are not necessary."

Now we know that these lectures have been a grand success, and that many of the manufacturers and merchants of the cities named have found it a great pleasure to contribute to the necessary labor and expense attending them—not in paying the lecturer, for he would accept nothing but the pleasure afforded him in doing a good deed to the poor and lowly, but in defraying bills for lecture halls, tickets, announcements, etc. Year after year these lectures have become more and more popular, and the workingmen now look for their annual pleasure with as great eagerness as the most inveterate popular lecture-goers.

Now it seems but one step to transfer such work from the platforms of great cities to the tabernacle of the tented grove. But who other than the "audacious doctor" would have thought of so doing, and would have boldly ventured to introduce scientific lectures as a part of the proceedings of a Sunday-school assembly? We reply, no other than Dr. Vincent, and to him belongs the credit of whatever success may have been reaped in this peculiar endeavor. It seems to have been his opinion that people need to know something about science before they can intelligently consider whether it conflicts with religion or not. The plan, therefore, as finally developed in his mind, was to give Christians at large, and Sunday-school workers in particular, an opportunity which but few of them could otherwise enjoy, of listening to a group of very distinguished men discuss a series of scientific questions, and present a set of lectures demonstrated by the finest and most interesting apparatus in the country. Dr. Doremus, of New York

city, came with the treasures of two very rich laboratories at his command, bringing no less than three tons of apparatus and material. And Professor Lattimore also brought from Rochester a rich selection of his choicest apparatus. To give their delicate experiments in the forest taxed the ingenuity of both of them to the utmost, and nothing but the most generous aid to each other as brothers in the cause of popularizing science could have brought them through successfully. The parts that were *seen*—the experiments—rather than what was *heard*, were the impressive parts. These experimental illustrations were simply magnificent, and in many cases could not be appreciated by the mass of the hearers; they were worthy of an audience of professional scientists. But, nevertheless, an impression was made that in the opinion of the lecturers themselves was worth all the outlay of money and brains that it cost. It was a great venture and a great success; and though much of such teaching must pass over the heads of a popular audience, it at least teaches them all to look *up*, and still up, to nature's God. Many expressed themselves more thrillingly impressed with the marvelous sermons delivered by the scientists than with those from the theologians.

With this simple presentation as a sort of defense, or logical "*raison d'être*," we proceed to a statement of the course of study in the Scientific Conference, in which we propose to be objective rather than subjective, holding, as far as in us lies, the mirror up to nature that she may tell us what was done by science in its effort to be for the time being the practical handmaid of religion.

This Scientific Conference was to last three days, and the proceedings were logically inaugurated by a general discourse on the "Circle of the Sciences," by Rev. Dr. Buckley. The speaker, after a general introduction, drew an outline map of the world of science, with the avowed object of throwing the gates ajar and pointing out the paths by which we may enter. He treated of the difficulties that stand in the way of the popularization — the "*vulgarization*" — of science under three heads: first, the use of the technical terms and the necessity of that use; second, of the necessary subdivision of science into different fields; and, finally, he gave a very exhaustive schedule of all the sciences, and their evolution or logical co-relation to

each other, closing with the following beautiful tribute to science as the Christian's *vade mecum* and defense:—

The value, then, of scientific knowledge to the teacher is immense, whether in the common schools or the Sabbath-schools. It enlarges his vision, trains his powers, prevents monotony, furnishes abundant material for illustration, and gives stimulus to all his communications. To the minister it is still more important. All that it does for the teacher it does for the minister. And more. It is almost a certain protection of his style from degenerating into mere cant, and it enriches it in every respect. It may, indeed, be pedantically exhibited on every occasion as on the wrong occasion. It may be substituted for the Gospel of the Son of God, and modes of reasoning which are not suited to the presentation of the Gospel may be ignored. But this is true of ancient literature. The abuses of scientific knowledge and processes can never be urged against its use. It would at least save some eloquent and spiritually minded men from exciting contempt by their ignorance. As he who, preaching from the text, "The Lord God is a sun," declared that if it were not for the sun we should be obliged to content ourselves with the "pale and insufficient light of the moon;" or as a quite noted and graduated man who recently published a sermon in which he based certain calculations on the supposed distance of the moon from the earth, making an error of such magnitude in the assured distance as to place him beneath duty.

But some timid soul may say, Is there not peril here? Nay, a devout man walks by faith. A man who dares not pray may be prevented from beginning to pray by skeptic persons' jests as he may by riches or honor. But a devout man may follow the facts of science every-where, and find in them all amazing illustrations and confirmations of the wisdom and power and upright hints of the goodness of the personal and merciful God whom he adores. But if he be not religious he can find materials enough to feed his skepticism, and to fatten it into unbelief.

Those, indeed, who would make the Bible a book of natural science and interpret its incidental allusions in harmony with successive phases of scientific research, thus making it an intellectual chameleon, have undertaken an impossible task; for the spiritual truths which they were designed to convey are draped in the thoughts, language, and supposed knowledge of the ages in which they are given. Job xxviii contains the praise of science, and distinguishes the sphere of religion.

Dr. Buckley's lecture proved a very fitting and acceptable introduction to the exercises. Though abstruse in substance, it was witty and wise, learned and still popular, and eminently adapted by its rare commingling of pleasantry, even with an imposing array of Greek and Latin terms, to attract the atten-

tion of his hearers to his logical analysis and comprehensive display of scientific knowledge, not very common in theological scholars.

Chancellor Haven, of Syracuse University, then followed with a lecture on the "Relation of Material Science to Mind and Spirit." After alluding to various philosophical theories of past ages, including those of Plato and Aristotle, he comes down through Bacon and Fichte to Darwin, who, he says,—

> tells us that every thing is developed or comes by a process of evolution, but he fails to tell us how the material arose out of the evolution, or why the evolution began, or what carries it on; and these all alike hover around these infinite mysteries of Nature and Mind. . . . Now, if man is a lie by accident or by creation, then the whole universe is a lie; but, nevertheless, if a lie, it is true to him, for truth is what a man sees; etymologically, truth is what a man thinks, "what a man troweth when he troweth right." Now here you see one connection of science with religion. Science is nothing; science is a mere vagary; science is a kaleidoscope; science is a mere collection of terms, unless there be truth; and all scientific men claim that the profoundest principles are "Love the truth; seek the truth; abide by the truth. Amen." But that is not science—that is religion. We believe that God is truth, and we believe that when man is right, man is truth; consequently, man's honest, clear, sharp, well-defined, accurate views of the universal science are truth.

The doctor then treated of the eternity of matter in all its changes, and found God in it—"God is light." There is in vegetation a mysterious power, and the development, from the highest class of vegetables to the lowest class of animals, teaches us a significant lesson; and there is no objection to development if thereby is meant creation, for development requires a developer. And with this train of reasoning the speaker arrived at the following eloquent and significant conclusion:—

> I say, then, to the scientific men, go on with your work; you are building better than you know, unless you catch the idea of religion and faith with your science, as most scientific men do. Why are modern men of science the noblest poets that utter our language, whether in measured terms or otherwise? Tyndall himself and Darwin are better metaphysical men than they think. Men such as Dawson and Winchell, and other men of this kind, show the real vital connection between philosophy and religion. They show the different departments of the great universe of truth, and that the unfolding of the lower prepares the way for the higher, and when the higher comes the lower is not annihilated

but still remains. Here is the crystal imbedded in the rock; so by its fruits, by the little fibers and threads that go out from it, it anticipates the coming vegetable, as Agassiz has so wonderfully shown; and then the vegetable, when it reaches perfection, pretypifies the coming animal, and the animal in its instincts pretypifies the coming understanding and reason of the man, and the understanding and the reason prepare the way for and pretypifies the coming faith—power—the soul-sight. Look upward as well as downward, aspire as well as grovel. The original scientific work, the laboratory work, the kitchen work, has something of the primal curse upon it. It covers the brow with sweat, it begets no high enthusiasm; but when one of those scientific men, catching the spirit of faith and religion, begins to create or tell how the Creator creates, then his eyes sparkle and his voice takes on ring and rhythm, and the multitude listen, and these scientific men gather their strength, and their eloquence, and their influence from the great primal religious truths which are the pillars of the universe. God has built the universe around spiritual truth. God is a spirit, and this material universe is but the clothing, but the instruments, but the machinery of his spirit, and we are but rethinking the thoughts of God when we study science.

The boldest move made during this Scientific Conference was the presentation of practical lectures, illustrated by delicate and expensive apparatus, in an extensive course of the most curious and instructive experiments, and for this purpose the services of the most capable and interesting scientific lecturer in the country had been obtained, namely, R. Ogden Doremus, M.D., LL.D., Professor of Chemistry at the Bellevue Hospital Medical College of New York city. Dr. Doremus was fitly introduced as a high-priest of science, whose name is every-where received with unbounded applause, and his first lecture was on "Heat: Its Sources and Effects." It was a very venturesome and doubtful experiment to undertake to perform in the open forest many of the delicate tests that often fail when surrounded by all the appliances and safeguards of the carefully constructed lecture-room, and the scientists themselves were prepared to submit to some mortifying failures. But these were few and far between, owing, in the first place, to the careful provision that had been made in the supply of instruments and chemical tests, but more especially to the fact that Drs. Doremus and Lattimore, up to that period strangers to each other, and, to a certain extent, rivals on the Chautauqua platform, joined hands as brothers, and, with coats off and sleeves

rolled up, aided each other so heartily and effectively in preparing the apparatus and performing the experiments, that admiring Chautauquans, looking on in surprise, were led to exclaim, "See what religion can do in harmonizing the antagonisms of science!"

This lecture gave unbounded satisfaction, and was a rare treat to many who never had had, and never would elsewhere have, the opportunity of witnessing extensive and delicate experiments illustrative of "heat" in all its various forces and phases. It was a rare sight to many to witness the freezing of mercury and the burning of charcoal in a glass tube at the same time. And nothing could be more wonderful than the illustration showing the formation of the earth from a fluid substance, as well as the solar system and the entire planetary world. In his beautiful experiments, so happily performed and popularly explained, many of the auditors saw so much of the wonders of nature that they were led to exclaim, "Glory to God!" at the culminating marvels of these scientific sermons. Dr. Doremus was ably seconded by his son, who has enjoyed the greatest advantages and the most extensive scientific culture that this country and Europe can afford, and who is ever at his father's side ready to hold up the latter's hands in the performance of their delicate and difficult work, to illustrate which they brought from their home laboratory about three tons of apparatus and a large supply of chemicals in solid and liquid and gaseous form; among the latter, in liquid form, five hundred gallons of laughing-gas and one gallon of liquefied carbonic acid, which, of course, expanded into vast proportions when permitted to assume the gaseous form.

Among the interesting exercises of each day was a "*scientific conversazione*," held at the close of the afternoon lecture, with a view of giving to all scientific scholars and amateurs present an opportunity to exchange views in regard to the particular points presented, or to present any other views of scientific matters that might legitimately pertain to the subject. The special topic of the first *conversazione* was, "The Importance of Science to the Religious Thinker." During the discussion the following positions were maintained: Science, when properly understood, is a true commentary on religion. There is a harmony between the spiritual and the natural. The relig-

ious teacher ought to have a fund of scientific knowledge that he may be able to meet the honest inquiries of Christians and the objections of skeptics. It is not pleasant to hear the assumption that there exists any antagonism between science and religion, for a full proportion—aye, a very large proportion—of scientific men are Christians. Nature is the most instructive illustrator of the truths of revelation. Science is truth systematized, and as such should be regarded as a revelation from God—divine utterance, as much as the written word. If not the infinity, the incomprehensible vastness of God may be seen in the universe around us. And this harmony between geology and revelation may be found in geological deductions of the first chapter of Genesis. In the general subject revelation is the true guide, illustrated by the sciences, for in some instances science greatly enlarges our views of the Scripture record.

Dr. Vincent presented the following summary of the points raised in the *conversazione*. The Christian teacher should study science:—

1. Because true Christianity has always fostered and developed science.

2. Because science is a revelation of the acts, character, and greatness of God.

3. Because science furnishes innumerable illustrations of spiritual truth.

4. Because science furnishes arguments against the conclusions of science falsely so-called.

5. Because scientific studies furnish arguments to satisfy the honest doubts of the young.

6. Because scientific studies promote individual power and a higher range of involuntary thinking.

7. Because it imparts a tone of reality to our habits of thinking and style of expression.

8. Because it creates a taste for a higher style of literature on the part of old and young.

9. Because it is valuable in revealing the works and word of God.

The evening of the first day was devoted to a lecture on "The Physical Forces," by Professor S. A. Lattimore, Ph. D., LL.D., of the University of Rochester, one of the most devoted

and instructive scientific lecturers within the pale of our own Church. His large experience in the matter of popularizing science for the workingmen, alluded to in the introduction to this article, made him a most fitting man to appear on the platform of Chautauqua to popularize science as such to the Christian masses in general and Sunday-school workers in particular. The lecture was given at night, to afford the professor the opportunity of illustrating his teachings by means of the lime light and a stereopticon. He made the physical forces of nature his willing servants, and bade them come forth from their hidden resources and substantiate his assertions as to their power. The beautiful and brilliant illustrations employed in the course of this lecture were received with applause and delight, and the whole effort was pronounced a perfect success, notwithstanding the great difficulty of arranging apparatus and performing such experiments in the open air.

Rev. E. F. Burr, D.D., opened the services of the second scientific day with a lecture on "Celestial Magnitudes." Dr. Burr is now pastor of the First Congregational Church in Lynn, Mass. He is a distinguished lecturer on the scientific evidences of Christianity at Amherst College; and as author he is widely known by his "*Ecce Cœlum*," in which he so beautifully illustrates the truth that "The heavens declare the glory of God, and the firmament showeth his handiwork." In his "*Pater Mundi*" he has made a strong plea for the truth of Christianity as seen in admitted or self-evident facts; and then he has given us the "Doctrine of Evolution," "*Ad Fidem*," etc., and if he has a weakness, it is a penchant for Latin titles to his books; but this we readily forgive him in view of their contents. His lecture on "Celestial Magnitudes" gave him a fine opportunity, in ornate and poetic style, to treat of the sublimest truths of creation, and creep "from nature up to nature's God." We could gladly ascend each round of the ladder with him as he starts with the nebulæ, rises to the clusters of stars, and witnesses the glory of the Creator in the very midst of those remote wonders of the sky; we would with him follow the comets in their flight, study the planets and their moons, and listen to the mysteries of the solar system; but time bids us simply stop at and give his climax and concluding words:—

This mere cluster of stars in which we have our home, grand as it is, gives us something grander in the Author of such a system as that. I see the very apex of being; I see the loftiest summit to which thought can climb; I see a Being of whom the milky way is but a shadow, the sun itself is but his shadow. Having these views, my hearers, I do not accord completely with the gentleman who addressed you yesterday morning. He was not disposed to admit theology into the grand circle of the sciences. I think he did not define science rightly. What is science? The true definition of science is the one given in the afternoon of yesterday. It is systematized knowledge; and have we no systematized knowledge of God? Certainly we have; and if we have, then I say that this is the grandest of all science. All the other sciences ought to revolve about this, and if this center of gravity be removed they necessarily fly into disorganization, and are worth nothing at all; and so I am very glad indeed of this scheme of services in which, as I understand the pivotal idea, the center of gravity, is theology—religion; and it is proposed to make chemistry and all the other members of the circle of sciences revolve about it. God speed you to the fulfillment of this very laudable scheme!

Professor Alexander Winchell, LL.D., whom it would be a superfluous compliment to introduce to readers of the "Quarterly," took up the train of thought of the preceding speaker, as a fitting introduction to his own discourse on "Words in the Rocks," by commencing in these terms:—

Mr. President, Ladies, and Gentlemen: Now that we have been led in thought to those magnificent intervals of space in which exist the planets and the stars and the nebulæ, all in the presence of Deity, and all ruled from the throne of the universe, let us inquire how human thought has been enabled to ascend to such lofty and sublime heights. Theology is a science which consists of the grand conclusions of all the sciences. The other sciences are but door-ways to the science of theology. Theology avails itself of them all; it outlines all truth and recognizes all truth as God's truth, and all the activities which manifest themselves in the world around us and the worlds above us as modes of activity of the one supreme power and intelligence. Man has not arisen in a leap to the contemplation of these lofty themes. Man begins with the earth, his home. He studies the pebble, and the rock, and the atmosphere that bathes his skin, and he finds here the alphabet of a system of learning which elevates his thought and imagination by degrees to the heavens, and the heaven of heavens.

Now we have had a glimpse of the magnificent altitudes to which science has exalted human thought; let us come back to study for a brief interval the alphabet which science has had to con before it had mastered these sublime lessons. And I feel that I have a claim upon your patience in view of the grand conclusions to which

we have just listened, for when you have learned that such are the ultimate conclusions of dry science, you certainly will bear with me in bringing your thoughts for a brief time to the facts which constitute the alphabet of this grand system of learning.

The learned geologist then went on to prove how emphatically he had read sermons in the stones, and found stories in the running brooks. He took his hearers on a tour in the immediate vicinity of Chautauqua, and unfolded to them the mysteries of the cliffs at Panama, not far distant, and read to them in the bowlders and pebbles a history far more ancient than that of man himself. He proved that rocks have a language, and traced their words with consummate skill, making the whole earth seem like a divine word to the man who reads it in a Christian and not in a cynical or skeptical spirit, and concluded as follows:—

If I had time, and if it were my appointed theme, I could show you more clearly still that the life-time of the system of worlds, or of the universe of suns, is but a finite span in boundless eternity; that there is no series of events in progress that is not destined to come to a natural and necessary conclusion, unless an outside Power intervenes to perpetuate and renew and restore some past condition of things again. So, finally, there is no self-supporting existence in all the realm of matter about us. The worlds and systems of worlds are passing through their several histories with their destinies as plainly inscribed on the pages of nature as is the limit of a man's life-time; and by and by this earth must cease to exist, not only as a habitable place for man, but as an abode suitable to any form of recognized existence—a changed, worn-out, senescent body, like the moon hanging uninhabited and uninhabitable in the heavens. And so do we find every thing within the material universe in a changing condition; and it must cease to act and move and be what it is, unless some power independent of matter, and higher than nature, shall be outstretched to renew the cycle of changes; and this is the revelation of God.

In the afternoon Professor Lattimore again stepped before an appreciative and applauding audience to treat of "The Wonders of the Sun." He first told of the Ptolemaic theory of our solar system, which made the earth the center, around which all revolve, and graphically delineated the long course of history which finally opened up to men's minds the wonderful truths of the theory of Copernicus, according to which the sun is the great center of them all. The long and groping

struggle of astronomers to get at and get out the great truth that would settle so many intricate problems in astronomy was related with great beauty while interviewing the story of Galileo, Kepler, and Tycho Brahe. Then came the maledictions and persecutions from the papal throne against those who revealed the truth; but the latter was too powerful to be obscured by pope or cardinal, and soon burst forth to a world that, in its turn, was too tardy in accepting it. For a long time the mechanical powers of the sun, so to speak, were the only ones that men dared to investigate, but at last they became curious about its real nature, and longed to know what the great luminary is made of. Thirty years ago this seemed a bold and silly question; but Dr. Doremus would now settle it to their satisfaction by means of the solar spectrum, which enables scientists to analyze the sun into its chemical constituents. Then came the marvelous data of solar forces in raising water, and supplying heat and light that had been bottled up for ages. Think of "bottled sunlight!" But this it is that gives to the coal its force, and after having lain for long ages concealed in the tissues of plants, comes forth to expand the water into steam and lend it the force that propels the locomotive and drives the machinery of countless manufactories of the industrial world. And we will reach the climax of the "Wonders of the Sun" in the lecturer's own words, leading him up to the God that created it:—

I say it was no extravaganza. A lump of coal may be considered as solidified sunlight. The power it is capable of giving you is not manufactured in it; it is not generated by its combustion; it is only evolved from it, as a spring may long be held down and yet when released exert its power, but you know perfectly well that some man first compressed that spring. So of all the forces we use for economic purposes, they may be traced directly back to the sun itself. These beautiful green leaves are woven by the golden fingers of the sun's rays; every atom is placed here through the agency of actinic force; every movement of these leaves by the wind is due to the sun acting on the atmosphere. The lash of these waves upon the shore all whisper to us in the language of that voice that has its utterance in yonder glorious orb. These are the views, ladies and gentlemen—not as the ancient views were, but the views of science demonstrative, and demonstrable science, that are opening before us, that show us in this new and wonderful light this beautiful universe of God. If, therefore, that is the great fountain of life and of light, how beautiful was the

poetic fancy of the ancient fire-worshipers who, in their ignorance, nevertheless recognized the great truth when they called themselves the children of the sun, when they worshiped his rising beams, and indeed the glorious light as the chosen emblem of God himself. These are thoughts, I think, that should find a lodgment in our hearts as well as in our minds; and as we look up to the glorious orb above, when as we think of his magnitude, as we think of his distance, and yet of his intimate nearness, as we think of our utter dependence day by day upon its light, we may find in this a still more glorious symbol than we have ever seen before of the vastness, the distance, and yet the nearness of Him who is the life of life.

And again, after the labors of this day, assembled another large audience to engage in a *conversazione* as to "The Best Means of Diffusing Scientific Knowledge among the Masses." We give the prominent thoughts that were brought forward: The God of nature and of revelation being the same, all theology that is true and all real science must be in perfect harmony. Truth was writ. Science should be examined in the light of religion, and religion in the light of science. Familiarity with both will enable us to see more clearly their harmony and the beauty of each. . . . All science should be stripped of its abstruseness and technicalities and brought down into the language of the common people. . . . Scientific subjects should, in a religious way, more fully engage the attention of the pulpit. . . . We should organize scientific clubs, institute scientific readings, and introduce more fully scientific works into our higher schools. . . . Special attention should be given to those sciences which lie nearest to Christianity. The religious element in man's nature is recognized by such philosophers as Tyndall, Ewald, and others, and really is the basis of Christianity. Man's religious nature is, then, a scientific principle, and as such it should be fully developed. If it were made to take its proper place in the broad field of science many a problem would be solved in both science and religion, and the harmony of both more clearly seen. . . . Public lectures, such as have been delivered here, should be published and scattered freely throughout the country.

In the evening of this day Dr. Doremus again took the stand to treat of "Heat Converted into Light." His subject was largely illustrated with experiments of the most interesting and valuable character. The Davy Safety Lamp was shown and

explained, metals and chemicals were burned, conductors and non-conductors of heat were explained, many interesting experiments were performed with phosphorus in combustion, the Gulf Stream was treated of, and the rise of balloons from heated air. And, finally, a beautiful allusion was made, in closing, to the great source of heat and light, in the following terms:—

With regard to the sun, philosophers have attempted to determine somewhat the amount of heat received from it, and how, and have constructed instruments to measure it. Careful experiments have been made by great physicists, and it is claimed we know approximately how much heat we receive from that brilliant orb, and attempts have been made to express it by the amount of coal which would be consumed in making a like amount of heat, or the amount of ice that would be melted by it.

It is the great Architect that builds up the great forest; it is the great Chemist that distills those acids and those sweets in the flowers of the world; it is the great Artist that paints the green tints of summer, and causes nature to put on the pantomime garb of autumn, like the hectic flush in the cheek of the consumptive.

It was once thought that these stellar hosts were like many friends, merely to give a glimmering light, but no warmth of heart; but it is claimed now that if each should be expressed numerically as we receive it from the sun, by the number of one hundredths, the number eighty would express the heat received from these stellar masses. Without their warmth plant life, animal life, human life, would be impossible upon this sphere. In the words of the poet Young:—

> "One sun by day, ten thousand suns by night,
> That lead us upward to the Deity;
> How glorious in magnificence and might."

But we have another great source of heat, and that is within our own globe. Yonder chart faintly expresses to us how we are incrusted with a series of layers, and how we receive warmth from within. Our earth is not cold at heart; it is a throbbing, pulsating organ within, which at times bursts forth, causing the rock-ribs to quake and man to tremble.

The Scientific Conference was appointed to last three days, and the morning exercises of the third and last day were opened by Rev. A. A. Hodge, Professor of Systematic Theology in the Western Theological Seminary, Alleghany, Pa. His subject was "The Relation of Bible Miracles to Modern Science," which he thus introduced:—

I wish to say, in commencing, that science itself never has assumed an attitude antagonistic to religion; that men of science have not—and that only a few men, not properly the exponents of science, who have advanced the philosophical speculation, have—declared, have proved not that science was antagonistic to religion, but that that philosophy was antagonistic. I think the most important thing now for us to do is to define what science is, and limit it in its scope. There is just as much difference between science and philosophy as there is between science and religion. Science has been defined as knowledge well grounded and well ordered. If knowledge be not well grounded it cannot constitute science, and if knowledge is not well ordered it cannot constitute science. Now, obviously, science does not include the whole mass of human knowledge. There is a necessary sphere of philosophy which is fundamental to science. It has never been pretended that there is one single property or matter, or a single law of nature ever discovered that was necessarily inconsistent with the idea of a supernatural power. Science justifies the conclusion that there is no case of spontaneous cause in external nature; that all phenomena are to be traced and adequately explained by invariable and self-executing laws; that every physical phenomenon that has been hitherto explained is subject to the operation of this law. The inference is that every phenomenon can be ultimately traced to an explanation by such law. When men in past ages have attributed these things to voluntary action they were mistaken. The inference is that the domain of the supernatural,—that is, the operation of voluntary causes—will be proven backward, and if there be a supernatural, it is not only unknown and unproven, but from the very limits of our faculties it is unknowable and not to be proved. We say the supernatural is impossible and therefore unhistorical. In all the great works on the subject you will find the argument is a constructive one, based upon this assumption: the supernatural is impossible, therefore the supernatural is unhistorical, and, therefore, the supernatural element of all these writings which claim to contain a supernatural revelation is to be eliminated from them, and the residuum is to be explained by natural causes.

With this introduction the speaker passed on to the definition of a miracle, speaking of it as something not impossible, but rather as highly probable, and then treating of its relation to human testimony. The word miracle is the most unfortunate one that could be found in the language to express the thought, for it conveys the idea of the wonderful and the marvelous, and, therefore, leads the unthinking and untutored to regard all miracles as such events, whereas God violated no laws in the performance of miracles—he simply interpolated a new cause; and this new condition is the Divine overcoming

the merely natural. Having finished his defense of the logical truth of miracles, he thus paid his respects, in closing, to some of the skeptical scientists of the day:—

I believe the great German physicists are right in the fundamental philosophy at the bottom of the theory of Darwin. I do not assume that the theory of evolution is true, but I mean Darwinism as held by Darwin and his disciples.

The confession that Professor Tyndall is bound to make is, that he sees in matter the promise and potency of every quality of life. In doing so he should have us believe, instead of degrading life down to matter, he would raise matter up to life. He seeks to explain the phenomenon of the mechanical parts, and he begins with the molecule. Each atom is capable in the lowest analysis only of mechanical actions, and these generate force. Heat is a mode of motion, and is simply an expression of mechanical force. So you rise up through all this physical force, and all claim to be equivalent and capable to be transformed one into the other, and then mechanical to vital force, and then vital to mental force. What does this mean? It means when you explain all the physical world by molecular motion that it is mechanical in its very scope and nature, and cannot go beyond it. And then as light and heat and electricity explain life, and life explains thought, then heat is thought, and feeling but a molecular motion at the last. If a man is capable of thinking this, then I acknowledge that for such a man for all time the supernatural is impossible, and so is all religion, and all hope in God, and all hope of immortality. If the soul has power of originating action, and power of discerning immutable truths and coming face to face with infinity; if it has power of moral determination, then I say the whole ground of this mechanical, materialistic objection is swept from under their feet now and forever.

Rev. L. T. Townsend, D.D., of the Boston Theological Seminary, then took the stand to discourse on "The Latest Results of Scientific Investigations, and the Bearings of the Bible Idea of Heaven." Dr. Townsend is well known to our own Church and beyond its pale as the author of "Credo," "Sword and Garment," "God-man," and other works of great interest to the Christian scholar.

His lecture was rather the apex and fitting conclusion to the series of admirable addresses pertaining to the relations between science and religion, and the whole drift of his argument was an endeavor to demonstrate that there is no antagonism between the two; they are all parts of one great truth, chapters of one great volume, and only seem antagonistic

because our eyes are too dim to see all the connecting lines and fill up all the chasms.

Darwin worked twenty years in the discovery of facts upon which to base his development theory; but his facts, so far as they are facts, and not theories, furnish data upon which to build religious as well as physical facts. To Darwin, therefore, as a gatherer of facts, the metaphysician and the theologian are under heavy obligations.

Herbert Spencer employed a still greater number of years in collecting facts to support his theory of the normal and the abnormal; but his facts have their bearing not only upon the theories of social conduct, but also upon all our views of moral and religious life and character. To him, therefore, as a fact gatherer, the naturalist and the religionist are likewise under no trifling indebtedness. To other men no less eminent in England, France, Germany, and America, we are all under profound obligations for their untiring and unwavering search and research; and we may add that it is only when these men become self-opinionist, when they acknowledge nothing beyond the range of their own observations—just as, when the man delving in the earth denies that there are stars, or when the star-gazer denies that there are earth caverns, or when the physicist denies the facts of the metaphysician, or when together they deny the facts of physical life and experience—that we are forced to stand aloof somewhat. Especially is this the case when these investigators, men of science, who are apt to forget that they are not scientific universalists but only specialists, confining their observations and experiments within the limits of their favorite pursuits, deduce those conclusions which they take to apply to the universe at large. But while their facts are invaluable, their conclusions, or rather the application of their conclusions, may be utterly erroneous. It must, therefore, also be evident that the man who stands aloof, and on a plane above all observations and experimenters, and yet friendly to all, and receiving the facts of all, is the only man of all who is qualified to make universal deductions, who holds the entire volume in his hand, instead of a volume or page; he is a universal scientist. When he considers these matters in the school of all arts and sciences, and draws these conclusions from the accumulation of facts furnished by the scientists of every school, he becomes the philosopher of philosophers, he is the prince of philosophers; and when this philosopher seeks to apply such deductions to the human race for its guidance and elevation, then he becomes the prince of philanthropists also. And it is on this ground that the philosophers and scientists of the day stand universally above the skeptic and the disbeliever. That is to say, when, for instance, Darwin insists on remaining with the earth-digger, his conclusions were applied to earth-works and to comparative physiology, but not necessarily to the within and the beyond. He will see development and order according to physical law, but will not see,

cannot see, God and the human soul. When Herbert Spencer allows himself to see nothing but animal man, his conclusions will apply to man and society, but not necessarily to God and the invisible. Now, if these eminent scientists would add to their present accumulation of facts the facts gleaned by other observers and experimenters, the facts, for instance, of religious experience and Christian consciousness, they would modify their conclusion and become princes of science and philosophy.

From this introduction we may truly say that Dr. Townsend evolved an address of singular beauty and thrilling power. It was a splendid defense of Bible truth, and with a master hand laid bare the limping fallacies and gaping arguments of those who would hound on science to question, sneer at, and attack Bible truths. It certainly gave unbounded satisfaction to many that were groping for light in the confusing labyrinth that skeptical scientists had prepared for them, and raised many an ardent Christian's soul from a state of fear and anxiety to a condition of perfect confidence that all is right and safe in the hands of God, whose works and words are destined to outlive and overwhelm the sneers and doubts of those who, knowing but *little* of this great scheme of creation, assume to know *all*, and put limits to God's own power. We would gladly quote more of the lecturer's own words were there time and space, but yield to the warning that we must now sum up the general results of this unique conference, and give an epitome of some of the most patent convictions that it seemed to make on the mind of those who took part in or listened to the proceedings.

In the first place we utter the convictions of all, perhaps, and certainly the loudly uttered assertions of many, that the programme was too full and the matter overdone. It was simply impossible for any one to listen to all the exercises with profit; the physical and the mental powers break down under such a continuous strain; it was like cramming for college examinations, and the moment one exercise was over it was not so much digested as crowded out to make room for a new occupant. And it is not a valid reply to this complaint that one need only take what he wants and leave the rest. Most of the visitors desired to have the whole, but found the strain too great for their capacities. One of the most efficient workers in the conference gives it as his opinion that it would have

been much better every way had the scientific lectures been distributed through the whole time of the assembly rather than crammed into three days. And we coincide in his views, for these reasons, among others: the attendance on these lectures was very excellent when we consider that they occurred during the opening days. But they were, or ought to have been, mainly for the great body of Sunday-school workers, many of whom could not be present so long before the assembly proper commenced, and who, therefore, missed much that would have been new, interesting, and valuable to them. Had the scientific and the religious features of the assembly been blended there would have been more logical harmony in the effort to unite and harmonize the two.

It is quite certain, we think, that the idea of a scientific course of investigation in connection with Sunday-school study worked its way into popularity, and that its influence will be widely felt and not forgotten by Christian workers. The time has come when the liberty of thought and investigation granted to men in religious matters leaves them free to find their pleasures and their profit in studying the higher and more abstruse sciences, if abstruse is a proper term in these days of "vulgarization" of science, by means of practical experiments and plain talks quite comprehensible to the uninitiated. These need some one to point out the way and describe to them the regions yet unexplored. The bold attacks of a few leading scientists of the world on the prominent positions of the Christian religion have led too many to believe that this feeling is quite general among scientific men. Now it is well to have some very effective means of curing this error, for it is not true. All through the course of history nearly all the leaders in scientific investigation have been Christian men. Now and then only some noted scientist has gained an unenviable reputation by boldness rather than by a display of scientific acumen, and the opposition that he has thus evolved has induced him to go still farther in his dangerous path, because it is so gratifying to his vanity to see his name in every journal and hear it pronounced by many lips.

But there is a host of noble names in the fore-front of scientific investigation for ages whose voices all spoke praise to the Deity. If there are now Tyndalls and Huxleys, and Spencers

and Darwins, have there not been Newtons, and Galileos, and Davys, and hosts of others of firm religious faith? And were there not on the grounds of Chautauqua some of the most noted scientific men of our land, all using their knowledge and their power to show their belief in God and illustrate the beauty and harmony of his works? The very presence of these men, and the confidence with which they grappled with the augury, filled many a Christian breast with courage and secret satisfaction that God's works and words are still defended by the wisest and noblest of his children. And the crowds that gathered around the scientists and with thoughtful face and eager eye watched their every movement and listened to every word, emphatically answered the question as to the desirability and success of such teachings, and repaid the anxious heart that was to bear all the contingencies of failure.

But the Conference of Science was a success, and was voted so by the hearty thanks of the closing assembly to the man and men who made it so, and by the devoutly-sung doxology, "Praise God, from whom all blessings flow," to Him who gave the incense from the planting of the germ. And no sooner had the benediction of the great Teacher been invoked on the work of the past than the word went forth, "What of the future?" And the reply came, "It shall be an improvement of the past." The groves of Chautauqua shall be like those of ancient Greece, rich in the teachings of the wisest men of the land. The leaders in scientific thought shall again come here, when the year rolls around and brings to us a return of this pleasant season, to mingle their scientific knowledge and love of God with the accents of those who proclaim and teach his word as revealed through his prophets to his children. And then the very rocks and stones shall continue to testify of his marvelous works in making this earth a habitation for the children of men, and a probationary school to prepare them for the better land.

ART. IV.—CATHOLICISM AND PROTESTANTISM AS PATRONS OF CHRISTIAN ART.

THE pernicious effects of the Reformation of the sixteenth century have been a favorite subject for comment by the Catholic historians, and been deeply deplored even by some of the Church of England. The assertion is reiterated that this great intellectual and religious convulsion was the fruitful cause of the spirit of modern rationalism, which sets aside a traditional faith and boldly challenges every thing which is urged upon its acceptance. Romanism holds Protestantism directly responsible for destroying the unity of the Church, and for shivering it into a multitude of unseemly fragments. It also charges that Protestantism was greatly wanting in æsthetic susceptibility—indeed, that it was essentially iconoclastic in spirit; that it caused a fearful destruction of works of art in the times immediately following the great schism, and that it ushered in a period of fearful art decadence. To examine the truth of these charges in so far as they concern art susceptibility and art inspiration, it will be necessary first to glance at the history of sacred art from the thirteenth century, that the condition of the public taste and the tendencies of art at the beginning of the sixteenth century may be understood.

The dawn of the revival is usually traced from the thirteenth century. The influences that had been powerful in developing that marvel of Christian art—gothic architecture—were multiplying in numbers and intensity. Before the close of this century chivalry and tournaments had been introduced even into Sweden. In Spain literature and science had awakened to a new life. The English Parliament had already been instituted. The Latins had conquered and sacked Constantinople. The weary despotism of ten centuries was yielding. Men were beginning to think and act as individuals. The occupation of Constantinople had re-established the intercourse between the East and West, and several Byzantine painters had emigrated to Germany and Italy. These were employed in the decoration of churches, chapels, and convents, and they naturally continued that traditional style that had ruled in the Orient for more than seven centuries. Few who have not

made these art-works a special study are aware how meager in treatment, how rigid in form, how repulsive in expression, and how limited in range, are the works of this period. At Pisa and Sienna these Byzantine artists had established schools, but none of their pupils yet ventured further than to copy and reproduce what was already at hand.

Nicholas Pisano (1231) first broke away from this bondage, marked out new paths, and attempted a new treatment. Feeling this inspiration, and touched with a measure of that warmth that had begun to thaw the frigidity of the centuries, Cimabue threw over his celebrated Madonna the radiance of hope, and gave to the divine Infant an expression of benignant invitation. The terrible severity that had caused the worshiper to tremble in the presence of Christ and the saints was now relaxed. "It was Cimabue's greatest glory, however, that he was the master of Giotto." The pupil carried the study of form and coloring far beyond his master's teachings. Nature had been the first instructor of this great genius while as a shepherd-boy he tended his father's flocks in the quiet valley of Vespignano. His poetical nature had, doubtless, been greatly stimulated by the companionship and writings of those immortal men—Coryphæi of their own, and towering in every age, Petrarch and Dante. His characteristic independence of thought, his exceptional freedom from the superstitions of his day, and his broad common sense, led him to adopt the best means to realize his ideals. Thus he not only greatly modified and improved the old, but did that characteristic work of true genius—gave to the world new art creations. Cimabue and Giotto were the fair dawn of that mid-day splendor of art that burst upon the world three centuries later in the matchless works of Da Vinci, Raphael, and Michael Angelo.

From the extant works of these artists it is evident that the hard, tyrannical dogmatism of the Byzantine school was then broken. In sacred art the thought had passed from a *theological* to a *religious* type. During the following century the imitators of Giotto, while yet restrained by the prevailing opinions in theology, reveal in their mode of treating religious subjects an increasing freedom. While Mariolatry is well-nigh supreme, and the Virgin is the central figure, yet the treatment now is more chaste and spiritual. The aim of the

artist is now the representation of *spiritual* beauty. The portrait of this period has been declared to be "an abounding religiousness struggling between a subjection to the traditions of the Church and the leadings of its own conscious powers." Notwithstanding the imperfection of drawing, the harshness of outline, and the strong tendencies to exaggeration, the religious artists of the fourteenth and the early part of the fifteenth centuries display a fervency of feeling, an unfeigned humility, an earnestness of soul, and a genuine reverence for the forms of the Church, that render their works a deserving study to every lover of the spiritual.

From the early revival to the first quarter of the fifteenth century art had been almost exclusively employed upon religious subjects. Take, for example, the life of John the Baptist, wrought out in 1330 by Andrea Pisano on the bronze doors of the Baptistry of St. John at Florence. The treatment is pure and simple, and intensely Christian. Likewise Ghiberti, in the next century, on the other two doors of the same baptistry, has represented the scenes from the Old Testament and from the life of Christ in a manner full of chasteness and spirit. Yet in Ghiberti's work there are clear indications of a growing naturalism.

During the fifteenth century two opposite tendencies are observed: One proposed attainment of beauty as an end; it interrogates nature, studies the effect of light and shade, and uses all possible appliances to secure this result. The other values physical beauty not as an end but as a means. With the latter school physical beauty is only desirable as it reveals spiritual loveliness. The feelings of these schools must have been very different as they attempted a subject of sacred art. One would seek a model in nature. If a Madonna is to be portrayed, the voluptuous beauty of a favorite is transferred to the canvas. Mere surface qualities are the result. No genuine religiousness pervades this school. The name only is preserved; yet even this is too often a glaring offense, a solemn mockery. The other school, called not inappropriately the Mystical, is best represented by that wonderful monk, Fra Angelico. in whose character true modesty, genuine sanctity, and matchless genius, so beautifully blended. With him art was a kind of religion. To paint a sacred subject was an act

of devoted piety. His biographer tells us with long-continued fasting and earnest prayer he prepared himself for his work—with what a feeling of conscious inspiration he executed it. Baptized, as he believed, with the Holy Ghost, his soul illuminated by celestial wisdom, his imagination kindled by a live coal from off the altar of sacrifice, Angelico expressed in his paintings a beauty, a spiritual loveliness, a depth of religious feeling, an ecstasy of hope and joy, and a heavenly sweetness, that have never been equaled. As we study the "Singing Angels" and the various other figures in his inimitable "Coronation of the Virgin," we feel assured that these are his own spiritual creations — entirely above mere copies — so varied, and yet so like in earnestness and purity, that they must be regarded as the products of his own deep religious contemplation. The expressions of the enthusiastic traveler, Holtzman, after he had studied his works at Florence, are just and true: "Here in Florence he seems to me like a faithful gardener, who understands how to transplant with tenderest care the beauty, blooming in Paradise, all fresh with life and health, into the soil of this poor earth. What pure reflection of divine rapture falls upon these faces! Here in the created is the echo of the Creator."

Bold investigators had already questioned the assumed prerogatives of the Church. Jerome of Prague and Huss had spoken and suffered; their ashes had proved good seed, and had fallen on receptive soil. The spirit of daring adventure had thrust men out into all lands; mind was stimulated for higher and still bolder flights. Art shared this impulse. It, too, was already loosing itself from the trammels of the Church. Invention was now rife. Already was the love of the antique greatly strengthened. The taste for the classical was reviving. Characters from sacred and profane history were now grouped together in the same painting. Perugino now associated in the same fresco, at Perugia, Moses, David, Isaiah, Daniel, John the Baptist, with Pythagoras, Socrates, Pericles, and Fabius Maximus. By the middle of the fifteenth century, Art, that had originally been a profession in the interest of the Church, was becoming rapidly secularized. But the scathing invectives and matchless eloquence of Savonarola were powerless to arrest the insetting tide of æsthetic and religious degeneracy. For a brief season

only did the sentiments of this great reformer impress the public heart. In vain did he utter his stern protest against the increasing superficiality and irreligiousness of art. His words of warning should sound in the ears of every age: "Only in a *formal* sense can beauty be represented as symmetry and harmony; in its vital essence it is the reflection of the godlike in the creature. Mark that man as he prays, as the divine effulgence illuminates his soul! When such a one returns from prayer, his face beams with the beauty of God, and his expression is that of an angel."

The papal court contributed largely to this degeneracy. No throne was ever disgraced by greater monsters of cruelty and lust than are found among the Borgia. Art, as prostitute as in the age of the Cesars, and artists, now degraded to basest sycophants, attempted the apotheosis of these bloody despots. Think of a Borgia as savior crowning his mistress queen of men and of angels! Little improvement in morals was witnessed under the Medici. Yet the brilliant galaxy of artists of this period has ever since been the marvel of the world. The works of Da Vinci, Angelo, Raphael, (each emphatically his own,) are incomparable. As a portraiture of character, probably Da Vinci's "Last Supper" has never been equaled. The "Christ" of this painting has never been excelled. Michael Angelo's "Prophets and Sibyls," in the Sistine Chapel, and his "Moses," are marvels of grandeur and power. Raphael's "Sistine Madonna," "Transfiguration," "St. Cecilia," etc., are wonderful revelations and interpretations of truth. With the most enthusiastic admirers we gladly recognize Leonardo as "a most profound and original thinker, the greatest mathematician and most ingenious mechanic of his time; architect, chemist, engineer, musician, poet, painter!—the miracle of that age of miracles!" we grant all that has been claimed for Michael Angelo; we indorse the statement that to a rare union of grace and versatility as an artist Raphael added "a bright, generous, genial, gentle spirit, the most attractive manners, and the most winning modesty."

Indeed, the opinion of the half-crazed Fuseli might be accepted as approximate truth:—

Michael Angelo planned for painting what Homer had planned for poetry, namely, the epic part, which, with the utmost simplic-

ity of the whole, should unite magnificence of plan and endless variety of subordinate parts. . . . That character and beauty were admitted only so far as they could be made subservient to grandeur. . . . Hence a beggar rose from his hand the patriarch of poverty, the hump of his dwarf is impressed with dignity; his women are molds of generation, his infants teem with the man, his men are a race of giants. . . . While Michael Angelo had no infancy, Raphael Sangio we see in his cradle, we hear him stammer; but *propriety* rocked the cradle, and *character* formed his lips.

Indeed, no one can deny that, under the hands of Da Vinci, M. Angelo, and Raphael, typical forms reached their highest development, and perfection of *composition* was closely approximated. But that these great artists received their inspiration from the spirit of the Catholic Church of the sixteenth century cannot be honestly pretended. Rather were the influences inspiring these great works absolutely foreign to the principles then recognized by this Church. The character of Michael Angelo was as essentially Protestant as that of Savonarola, whose early friend and admirer he was, and whose fiery discourses were his favorite study. Buonarotti lived in a world of thought totally different from that of the great mass of even the ecclesiastical princes of his day. The garden of Grecian statuary at Florence reveals the chief source of the inspiration of his genius.

So much for painting and sculpture. The study of architecture is equally instructive. From the period just prior to the Reformation, church building in Italy received a wonderful impulse. South of the Alps the Gothic style had never been a favorite; indeed, it was hardly practiced in the Italian peninsula prior to the thirteenth century, and then not in its purest form. The spirit of trust and of aspiring devotion, so well typified by the Gothic architecture, seemed little at home where a spiritual despotism had been so long predominant. Vain dreams of a holy Roman empire had been indulged by temporal princes, but all the essential elements of this absolutism were found in the Roman hierarchy. So that the representative building of the Catholicism of this period—Saint Peter's at Rome—stands as a monument of the idea of Roman imperialism. Its spirit is Roman, not Christian. When Michael Angelo said of its dome, "I will hang up the Pantheon in mid-

air," he insensibly revealed the inspiration of the building. It stands as a monument of genius; but it is a genius inspired with the spirit of pagan antiquity, and not by the spirit of trusting, aspiring Christianity. It stands more as a gratification of selfish ambition than as an offering of humble hearts to the Lord Christ. The very means by which funds for its erection were obtained form the most eloquent commentary on the condition of the Church, and on the spirit of the projectors and patrons of this work. Money from those damnable indulgences, which were peddled throughout Europe as cheap merchandise, went into its walls. Lying to men, robbing God, profaning the holy offices of Christ, periling eternal interests—these contributed its materials. Not a stone laid in this monumental Church that did not imperil an immortal soul. Taine is perhaps too caustic in saying, "The builders of St. Peter's were simply pagans in fear of damnation, and nothing more. All that is sublime in religion, such as tender effusions in the presence of a compassionate Saviour, the fear of conscience before a just Judge, the strong lyric enthusiasm of the Hebrew before an avenging God, the expressiveness of a free Greek genius before natural and joyous beauty—all these sentiments were wanting in them." Yet it is true that the spirit of St. Peter's is not Christian. So with many of the churches of the Jesuits, the most legitimate offspring of Rome. These are usually beautiful, often charming, not infrequently gorgeous in adornings and incomparably rich in furnishings; yet they are usually Roman in spirit, and the life and liberty of the Gospel find in these no congenial representative home.

Contrariwise in Germany and in all the continental lands that embraced the reformed doctrines, ecclesiastical building almost entirely ceased during the last half of the sixteenth century. But the causes of this are far other than a hatred of art, or a spirit of indifference. All reactions are excessive; this one of the Reformation was most violent. The struggle was for life. All merely artistic or æsthetic questions were now swallowed up in the pressing necessities of the desperate contest. Then followed the desolating thirty years' war, from whose awful ruin Germany can never recover. Remembering that a degree of leisure and a surplus of wealth are the almost indispensable conditions of extensive art patronage and cultivation,

we should not be surprised at the fewness of imposing ecclesiastical structures which arose in northern Europe. Nevertheless, Protestantism has not infrequently been more careful to preserve the medieval beauty and simplicity and the purity of architectural style than the Catholic Church itself. Let the visitor to the city of Nürnberg compare the Church of St. Lawrence with that of Notre Dame. The former, which was founded by a pious artistic feeling truly original and charming, has been preserved unchanged, as the Reformation found it; while the latter, which has been given over to Catholic worship, has been largely modernized and ornamented in such tawdry and mannered style as to offend and disgust. Likewise, when we compare the most noted modern church of Catholic lands (St. Paul's in Ostia, at Rome) with the completion of the Cologne Cathedral by Protestant gifts, and largely by the aid of Protestant princes, we are loth to believe that the spirit of Protestantism can be hostile to architectural beauty. The interior of the immensely costly St. Paul's in Ostia professes to be an imitation of the early Christian basilica. While this is immense and simple, yet it is cold in effect, and its exterior, in tower and façade, is a conglomeration of varied styles jumbled together in such inextricable confusion as to remind the visitor of the crazy freaks of a drunken man. On the contrary, the Cologne Cathedral is being finished in the same purity and beauty of style in which it was conceived five hundred years ago. (See HASE, *Protestantische Polemik*, p. 601.)

When we examine the history of the Phonetic arts—music, poetry, and oratory—we find that the record of Protestantism is especially honorable; indeed, she has here achieved very marked triumphs. Brendel (*Geschichte der Musik*, Band I, sec. 8) has remarked that while music was carefully cultivated among the Greeks, the results attained were comparatively meager. This came from no lack of talent, but rather because music found there no truly congenial soil. Music is eminently the art of the emotions. As such it expresses the innermost feelings of the soul. But this inner world could not be moved by the cold and cheerless system of heathenism, it could first be reached and stirred by the warmer and more genial influence of Christianity. Just as far, then, as the distinctive spirit of Christianity is preserved in any system will it fulfill the con-

ditions of the production and patronage of a superior sacred music; contrariwise, in so far as there is a return to the spirit of heathenism by any nominally Christian Church, to that extent will the conditions of high musical creation be wanting. That the Romish Church imbibed much of this spirit was pointed out by Zuinglius in his controversy with the hierarchy when he charged that it was a heathenish corruption of pure Christianity. And many able writers on Christian doctrine have boldly reiterated this change. (De Valenti, Neander, Hase, etc.) The music used in the Church service prior to the middle of the sixteenth century was mostly indifferent, and poorly adapted to the sacredness of worship. The rude beginnings of the Oratorio, in the attempts of St. Philip Neri to draw away the crowd from the influence of the Roman theater, are most instructive. The spirit of Romanism was revealed in seizing upon whatever was striking and dramatic to arrest the attention of the populace. Secular melodies had been freely accepted by this Church, and were the suggestion of the music for the most sacred festivals. The names of masses were sometimes derived from the initial words of these secular songs that were accustomed to be used in most indecent relations. "The Armed Man," "the Jolly Red Nose," "Kiss me, dear," as names of sacred music suggest their origin. So wide-spread had become this degeneracy that the Council of Trent deemed it important to give the subject a thorough and protracted discussion. Yet the suggestions made during its twenty-second sitting were too little heeded. Even in our time, some of the musical performances even of St. Peter's and the Sistine Chapel provoked the remark of Felix Mendelssohn, that to him their singing sounded like the efforts of a lot of men who are maliciously squabbling to drown each other by their brawling.

In this connection is suggested the name of Palestrina, the prince of Italian composers of sacred music, the pride of Catholicism. But it must be remarked that Palestrina is as distinctly Protestant in the spirit of his music as was Michael Angelo in his art creations. Palestrina was the pupil of Goudimel, who set to music the Psalms of Clement Marot, and afterward suffered martyrdom as a Huguenot on St. Bartholomew's day. Moreover, Palestrina's wonderful service to music was only one result of the strong reactionary influence of Protestantism upon

the Catholic Church in reforming its morals and its forms of worship. Goudimel's music has continued prominent in the worship of the Reformed Church to the present day, and the long line of able writers of sacred music, as Tallis, Hans Walter, Rumpf, Schütz, Bach, Handel, Hiller, Bennett, Rinck, Mason, and others, illustrates the liberal cultivation and patronage of sacred music on the part of Protestant Christianity. Equal musical genius is found in the Catholic Church. Hayden, Mozart, and Beethoven were all in this communion. Yet not one of these incomparable masters is influenced to any considerable extent by the spirit of the Romish Church. Hayden was outwardly a Catholic, adhering to the forms of antiquity; inwardly and in his works he lives and moves in a totally different world. Mozart leaps all the barriers of Church authority, and in his methods contradicts many of the fundamental principles of his communion; while with Beethoven this lack of harmony of profession and life is most manifest and outspoken. With all these musical Coryphæi is the spirit of the Church of the mediæval centuries entirely without authority. Both in secular and sacred music they entirely break away from all these restraints, and created their immortal works in accordance with that peculiar and darling principal of Protestantism—the unrestrained freedom of individual genius.*

The comparative examination of the poetry and oratory of these two branches of Christendom constitutes an interesting and instructive study, but the limits of this paper will allow us to glance only at the sacred lyrics of the two communions. The history of hymnology, since the sixteenth century, will show the great superiority in number, in earnest devotion, glowing fervor, and deep spiritual insight of the hymns of the lands which accepted the Reformation. In the Lutheran Church alone are found more than 80,000 of these hymns. It is difficult to estimate the wealth of spiritual treasure bequeathed to the Church by the long line of Protestant writers of sacred lyrics. Luther, almost the prince of them all, Paul Fleming, Schirmer, Zinzendorf, the Wesleys, Watts, Toplady, Lavater, Novalis, Arndt, Knapp, and a host of others, have comforted repentant souls, have stimulated religious life, and have lifted trusting hearts toward heaven on

* See Brendel, *Geschichte der Musik.*

the wings of rapturous praise. It has been the especial bequest of Protestantism to the Church of believers to give to the congregation sacred lyric wedded to sacred music, and to realize the exhortation of the psalmist: "Let all the people praise Thee."

Nor is the statement (so frequently reiterated) that the Romish service is more æsthetic than that of Protestantism, the result of the careful study of the central principles of the two systems. We hear much of the baldness of the Protestant service, of the lack of artistic accompaniment, and much is said by tourists to the old world of the grandeur of the Catholic ritual. We believe that this view is radically erroneous. It comes from confounding semi-barbaric pomp with the genuinely and intrinsically beautiful and sublime. Years ago Hengstenberg wrote:—

> The opinion that the Romish worship is more poetic than the Protestant has widely obtained, and even now controls many weak natures. Yes, if poetry consists in mere mechanical forms and surface ornamentation for delighting the sensuous nature, then this opinion might be just. But poetry is soul, which speaks to soul again; and the simple singing the hymns of a Luther, or Paul Gerhard, out of the heart of a living communion, is more poetical than all the sensual gratification of the eye and ear afforded by the most pompous Catholic ceremony.*

It is somewhat remarkable that a Protestant of an entirely different school, in an estimate of the relative effect of Romish and Protestant ritual, entirely agrees in spirit with this remark of the high Lutheran, Hengstenberg.†

2. During the latter half of the sixteenth century Christian art rapidly declined, and at the close of this century it had reached a stage of great degeneracy. Not only the number of superior *works*, but also of superior *artists*, had greatly diminished. Grüneisen has well said: "When a great genius departs this life he may and must impress his own powers, unconquered by death, on his surviving works; but very rarely does he bequeath these powers to his followers."‡ The excellence of Raphael and his contemporaries being well-nigh absolute, a decadence might be expected. But we have indicated

* Hengstenberg, in *Ev. Zeitung*.

† See E. E. Hale in *Ch. Union*, August 13, 1873.

‡ *De Protestantisme*, p. 4.

that the prime cause of the decline in pure spirituality in art lay far back of the Reformation; indeed, it was the legitimate fruit of that degeneracy which was the occasion of rousing the spirit of protest in the bosom of the Church, and of leading the Reformers to assume an attitude of opposition and independence. The circumstances attending the beginnings of Protestantism were confessedly very unfavorable to the encouragement of the fine arts. Attention was absorbed in the solution of other and more pressing questions. Violent agitation is generally unpropitious to art encouragement. A degree of leisure and accumulated wealth are the usual conditions of æsthetic culture and art patronage. For one hundred and fifty years after the beginning of the great Reformation these conditions were almost totally wanting to Northern Europe. Human history scarcely presents a period of more profound and universal agitation. The fierce conflicts of temporal princes on the battle-field were surpassed by the struggles of intellectual and theological athletes. The picture presented is not that of the overpowering mastery of one sovereign, or of one party, and the consequent accumulations of the wealth of subject provinces in the capital of the conqueror. We witness no grand triumphal processions, no wars of permanent settlement, no final solution of religious problems; but continental Europe presented, down to the peace of Westphalia, a picture of evenly-balanced, destructive, and exhaustive warfare. However this question of adverse influences may be answered by different schools of history, all thoughtful persons must feel a common regret at the wanton destruction of rarest works of art during these years of convulsion. The fiercest spirit of iconoclasm seemed rampant. The French Huguenots burned indiscriminately the altars and statues, wherever found. During three days of popular frenzy the inhabitants of Brabante and Flanders laid waste more than four hundred churches. The same spirit involved nearly all Belgium in the most calamitous loss of sacred relics, and prevailed very widely throughout Scotland, Switzerland, Bohemia, and some parts of Germany.

It is a noteworthy fact that with the mad zeal which manifested itself in this indiscriminate ruin the leaders of the Reformed Churches had no sympathy. This destruction was

largely the work of the lawless rabble under the leadership of frenzied fanatics. Even John Knox earnestly exerted himself to check this spirit in Scotland, and in the Netherlands no prominent leader of the Protestant party was guilty of this vandalism.

In Zürich still stands the church in which Zuinglius preached a purer faith. In the interior the visitor finds no trace of ornamentation, not a statue, or picture, or any such thing; but the walls are as plain and white, and the seats as simple, as in the Moravian church at Herrnhut. The unthinking traveler is ready to conclude that here, surely, are the footprints of the stern reformer, who is wanting in all æsthetic sensibility, and whose warrior hand would sweep away without one soul-twinge even the masterpieces of art. Yet we find him in the retirement of home relieving his severer studies and his racked brain by the practice of music, changing from harp to flute, and giving his buoyant nature free vent in light fantastic strains. We hear his cheerful, and even mirthful, conversations with bosom friends; at times we note even an exuberance of joy. Zuinglius was no harsh, fanatical hater of sacred art; his was no stolid soul, insensible to æsthetic charms. He was only an honest Christian, zealous for the true welfare of the people and for the glory of God. Turning from his private life to his own utterances, made under the most solemn and trying circumstances, we are further confirmed in this opinion. Hear him:—

> No one is so foolish as to believe that statues and paintings ought to be destroyed, if the people manifest for them no reverence. Only those images ought to be removed that cause piety to stumble, or that threaten our faith in God. Of this class are such as bear the human countenance, which are placed in front of altars or churches, even though they have not been reckoned among things devoted to God. because age itself renders an image sacred. In like manner we do not think that those figures that are inserted for the purpose of ornamenting the windows should be disturbed, provided they represent nothing base, because no one is in danger of worshiping these. . . . We will not speak at all of feelings and preferences in this matter; *for none have greater admiration for paintings, statues, and portraits than we; but whatever thus offends piety ought not to be tolerated, but should be destroyed by the firm authority of the magistrates.*

Calvin, a man of more culture, and, in some respects, of sterner type than Zuinglius, has recorded similar opinions of art. He writes:—

Nor yet am I affected with that degree of superstition as to suppose that no images at all ought to be tolerated. But inasmuch as painting and sculpture are God's gifts, I only demand that the use of each shall be pure and legitimate. For why should that which God has conferred upon us for his glory and our own welfare be not only degraded by absurd use, but even turned to our own ruin? It follows, therefore, that only those things ought to be sculptured and painted which are designed to appeal to the eye. The majesty of God, which so far transcends the power of vision, should not be marred by unworthy images. To this class [of legitimate subjects] belong historic personages and events; to some extent, also, images and representations of forms that have no regard to historic truthfulness. The former class have a certain value for purposes of teaching and admonition; what the latter class can impart, aside from pleasurable amusement, I do not see. Yet it is certain that the images that have been set up in the churches belong for the most part to this latter class. Hence it is just to conclude that these have been placed there not with judgment and discretion, but through a vain and thoughtless spirit. I decline to point out how defective, and, for the most part, indelicate are these portrayals, how without restraint the painters and sculptors here wanton: I only say that even if no vice inheres in these works, they are nevertheless valueless for purposes of edification and instruction.

Calvin here expresses an opinion more extreme than would have been accepted by Zuinglius; nevertheless, he appears to be more appreciative of art than his friends or his enemies are wont to suppose. We are not interested to criticize the æsthetic propriety of the opinions expressed in these quotations; we believe that they find sympathy with a very considerable class of tourists as they come into the presence of some of the nude and shameless paintings and statues of European galleries. This one thing is certainly clear, namely: that the object of Calvin's hostility is not art *per se* but rather its prostitution to base and unworthy ends.

Beza, the companion of Calvin, one of the most noted religious poets of his age, discourses in very similar spirit, and makes like careful discriminations, thus vindicating the Reformation from the charge of hostility to art. He says:—

We recognize that painting and sculpture have great utility in civil affairs; of this there can be no question whatever. . . . We

do not condemn, but, on the contrary, approve, these arts, and aver that they ought to be cultivated because useful to the State. But while we do not deny the utility of art, either pictured or sculptured, by which events in sacred history may be represented, we do not readily admit them to places consecrated to worship, since we think it especially unsafe to place sculptured images in the churches. This is not because we suppose this is unlawful or impious *per se*, but on account of the mournful appearance presented by congregations in Romish churches; which sad spectacle seems to date its origin from the use of images and pictures.

All are familiar with the love which Luther cherished for art. Less thorough in breaking away from the Romish ritual than his fellows, he inclined to retain in the forms of service much that the Reformed Church regarded dangerous to the edification and purity of worship. He that could find relief from the vexatious and overwhelming burdens of life in the production of poetry and music, often had his great soul tried by the rude, unfeeling iconoclasts of his day. He says:—

I am by no means of the opinion that the Gospel teaches that all art should be destroyed and should disappear, as some fanatics hold; but I would gladly see all the fine arts, especially music, pressed into the service of Him who has created and given them to us.

He sternly rebuked Carlstadt for his false notions of reform:—

Since the evil disposition in Carlstadt is so stubborn, I can less than ever yield to his obstinacy and insult. I will first speak of images under the law of Moses; next according to the spirit of the Gospel. I affirm that, according to the law of Moses, no other image than that of God was interdicted. But a crucifix or the image of a saint is not forbidden to us.

Again he writes:—

I have seen and heard the iconoclasts themselves read out of my German Bible; I also know that they have this Bible in their possession. Now there are many pictures in these books of God, of angels, of men, and of beasts; especially in the Apocalypse of John, and in the books of Moses and Joshua. So that we earnestly request them to permit us to do what they themselves practice, namely: that we may paint such pictures on the walls for their better remembrance and understanding, since they are as harmless when on walls as when in books. It is better to paint on the walls representations of the creation of the world, the building of the ark by Noah, and other events in sacred history than some shameless profane subject. Indeed, God willing, I

would persuade the noble and the wealthy that it would be a Christian work to paint the scenes of the entire Bible on the walls of houses, within and without, before the eyes of every one If it is not only not sinful but blessed to bear the image of Christ in the heart, why should it be regarded a sin to bear it in the eye. Surely the heart is of more consequence than the eyes, and it should be less defiled by sin; since in the heart is the proper residence and dwelling-place of God.

So much for the opinions of the chief reformers. They all go to show that with these earnest men there is a real appreciation of the beautiful—indeed, a true love of art. The whole force of their protest is directed against the shameful prostitution of sacred art to vulgar and unworthy ends, and against supplanting, by the adoration of images, the pure thoughts of God and Christ from the soul of the worshiper. The seeds of degeneracy had long before been sown. These men were struggling to cast into the oven the baneful harvest. The Reformation, so far from being the *cause* of the decadence of sacred art, was a protest against that spirit which was destroying the very capacity for high art—a spirit that had already produced a wide-spread moral degeneracy; had brought corruption into high places; had quenched the ardor of piety; had insinuated itself into the religious houses of every order; and had thoroughly relaxed the sinews of monastic discipline. It is believed that a like vindication of the reformers and the Reformation would appear on a careful comparison of the religious art of the lands that embraced the Reformed doctrines with that of nations that were little influenced by its spirit. This would form a suggestive chapter in the history of sacred art. It must suffice here to mention such men as Albert Dürer, in his latest works, Hans Holbein, and Lucas Cranach, as compared with Titian and Correggio; or later, Van Dyck and others, as contrasted with the brothers Carracci. Who can hesitate to accord to the north the greater depth, earnestness, religious fervor, and spirituality?

3. Some diversities of Catholicism and Protestantism, which would affect, to a degree, the respective attitudes of these confessions toward religious art, and determine how far the two systems furnish the necessary conditions of art stimulus and encouragement, need next to be examined. It is not the purpose of this paper to enter the field of religious polemics;

but it seems necessary to glance at the nature of these diversities in order to see clearly their effect not on questions of theology, Church life, ethics, etc., only, but also on questions of an æsthetic character. It should be distinctly understood that Catholicism and Protestantism have vastly more than merely formal or surface differences. They are radical and fundamental; they affect the foundations of faith and life. Möhler, one of the profoundest Catholic dogmatic writers of the present century, has most justly said: "The great rupture of the sixteenth century took its departure from the innermost and deepest profound of human history, since it had reference to the mode and means by which fallen man must come into fellowship with Christ and become partaker of the fruits of redemption." Indeed, it can be truly affirmed that no more distinct are the great oceanic currents that run side by side for a thousand miles without once commingling, than are these two tides of theologic thought. From the fundamental differences of opinion respecting the nature of the original, unfallen man, and the effects of transgression upon this nature, would also arise very diverse systems of soteriology. Catholic anthropology holds that the unfallen man was righteous by virtue of a supernatural working of divine grace upon him, and not by virtue of the action of the natural powers of the human soul. A true, life-giving knowledge was, therefore, in itself impossible; but a power must be superadded to raise this finite to a saving relationship to the infinite Creator. Luther says: The pure nature of man, proceeding from the word of power of the Creator, possessed absolutely *in itself* all the necessary capabilities for pleasing God. Specially the religious capabilities of the original man flourished under the favor of God by virtue of their own increated fullness of power. Catholicism says: The fallen man has experienced a *weakening* (*in deterius commutatum fuisse*) of his natural powers for good. Evangelical Protestantism says: By the loss of original righteousness the fallen man has experienced a *total depravity* of his spiritual nature, whereby he has become alienated from God and inclined to evil. This diversity of opinion respecting the nature of the unfallen man and the nature and effects of sin would occasion corresponding divergencies with respect to the ground and nature of justification, the nature and efficacy

of the sacraments, the whole theory of worship, and the nature, constitution, duties, and prerogatives of the Church. Without stopping here to compare these systems, we only remark that there appears in the Catholic theology more of superficiality; in that of Evangelical Protestantism more thorough radicalism. The original man of Catholicism was holy by virtue of an *added* power, (*dona supernaturalia;*) that of Protestantism was holy by *nature*, (*vere naturalem.*) The fallen man of Catholicism has lost only the *added* power; that of Protestantism lies in hopeless ruin.* The restored man of Catholicism can do something and merit something by this doing; that of Protestantism knows no possible merit of works. The triune God is equally the sole object of true worship in both these systems. Yet, while the Catholic worshiper finds Christ not the only Mediator, but invokes and adores the virgin and the saints, the Protestant worshiper sees in Christ Jesus the *one* Mediator between God and man. While the Catholic worshiper is looking outward toward the virgin, and saints, and images, and relics, and shrines, and works of supererogation, and the cleansing fires of purgatory for means of salvation, the Protestant worshiper turns his thought inward to discover the attitude of the will, and to note and cherish a growing faith in the Son of God, and in the Holy Spirit, who is the promised sanctifier.

4. Another most important difference of these systems has reference to the grounds of authority and the right of private judgment; in other words, it respects the great question of freedom of thought and action.

As ground of authority in religious questions Catholicism says: Scripture, tradition, and the Church. "Tradition" has too often been the shibboleth of Rome. Its practice has been too much like that of Pharisaism in the Saviour's day—hiding the spirit and letter of the law under the traditions of men. Protestantism cries: "The Bible the word of God; this is the sole ground of authority, the source of religious enlightenment." Catholicism is ever looking to the past, and trying to press modern thought into the molds of bygone centuries. The genius of Protestantism does not propose to study the ancient Church and its pristine glory only, but to push forward the cause

* See Winer, *Comparative Symbolik*, ch. iv, v.

of God with all the appliances which the unfolding history of the race has placed at her command. Catholicism, like heathen art in its decrepitude from the time of Mark Aurelius, turns its weary eyes backward to find its golden age. Protestantism, like the earliest Christian art, is full of hope, and joy, and promise—projecting the grandest triumph of its Christ on the sky of the future. Theoretically Romanism binds the consciences of men, individual and collective, by the will of one man, and cries, "Here alone is the oracle of God; here immolate your personality; passive obedience is a means of salvation." Protestantism proposes to bring the individual soul into the conscious presence of the King Eternal, and says, "Here pay your *active, willing* obedience." Romanism has too often brought outward compulsion upon human mind as upon inert matter, to drive it hither and thither at pleasure. It has too often anathematized; it has hurled thunderbolts to frighten men to outward submission; it has abridged liberty; it has maimed, and shackled, and palsied the soul. Protestantism, like the Bible, and the God of its Bible, has come with reason, persuasion, and entreaty. It has come with threatening and with promise, with invitation and denunciation. It proffers illumination, guidance, and powerful incentive to lead the soul godward; but "it exhorts to an uncompelled, undamaged service of the man to God."* The wall of protection which the Almighty has thrown around every man's personality, and within whose sacred precincts he himself does not come unbidden, Romanism seeks to break down; Protestantism respects and guards. Romanism, like Jesuitism, its most powerful ally, treats man individual too much as a thing, a tool, a corpse, to be acted upon by external force, to be urged hither and thither at the will of another. Protestantism recognizes man individual as a spiritual force; he belongs to the realm of *powers*. Romanism dictates, excommunicates, and forces its dogmas upon its votaries. Protestantism proposes systems, expresses opinions, urges arguments, and gives a reason for the hope within it. It is not now claimed that the invariable *practices* of these rival systems are here described. That there have been instances of generous toleration within the Romish communion a L'Hopital and Lord Baltimore

* Isaac Taylor: "Loyola and Jesuitism."

abundantly witness; that bitterest intolerance has at times disgraced Protestantism, the Servetus affair must ever attest. Both communions have been at times unrelenting persecutors; both have invoked the aid of the civil power to suppress heresy; both have piled and lighted fagots to consume the unrecanting offender. Universal history utters its solemn warning against the danger of intrusting irresponsible power to *any party whatsoever*. Yet the conclusions of a writer who cannot be accused of concealing the short-comings of Evangelical Protestantism are forced upon us. "It can surely be no exaggeration to say that the Church of Rome has inflicted a greater amount of unmerited suffering than any other religion that has ever existed among mankind."* It is equally certain that in the indulgence of the spirit of persecution Protestantism has appeared more offensive than her rival, because it was in glaring contradiction to one of her dearest fundamental principles; while the violent suppression of heresy is not inconsistent with the teachings of the approved standards of the Catholic Church. Indeed, Romanism has manifested this spirit in a thousand ways, by cramping thought, by stifling investigation, and by putting shackles upon genius. The study of the literary policy of Rome, as found in her damnatory indexes and in the decisions of the Council of Trent, compels the conviction that the spirit of this Church toward literature and art is in the last extreme arbitrary and repressing.†

The application of these principles to our discussion is simple and manifest. All agree that freedom is the indispensable condition of art development and progress. Religious art, especially, languishes in the absence of liberty. The fixedness of type, and the centuries of stagnation while art was under the ecclesiastical control of the East, is an instructive example of this truth. We have already mentioned that this authority bound religious art in fetters for nearly a thousand years. This does not imply that the artist is not to consult tradition. To him, as well as to the religionist, is tradition invaluable, since by this means there is noted an historic progress and development. For this very reason, however, must the artist equally with the religionist and the scientist, the individual as well as the

* Leckey: "History of Rationalism," vol. ii, p. 46.

† See Mendham: "The Literary Policy of the Church of Rome Exhibited."

Church, remain unshackled by tradition. "To ascribe to tradition, or to any, even a classical rule, an absolutely binding value, would be as senseless as to prevent a tree from further growth because it *had hitherto been vigorous*. On the contrary, because growth is the very law of the tree, it must continue to grow if it would not wither and rot." * Just so because artists *have* created art forms, must they continue to create them under the largest freedom if they would avoid falling into a stiff, cold, and fatal mannerism. We do not mean by freedom any wild, unrestrained, or arbitrary exercise of power; this is *license*, not liberty. In political and social life liberty does not mean lawlessness; but living in accordance with the laws of our nature, modified only by the necessary limitations of society. So the artist must ever work under law in order to the exercise of his highest freedom, but this law cannot be imposed from without; it must be an impulse springing from his own native and distinct individualism. This law must not be to him an external, written canon, which he feels bound to observe, but a part of his own untrammeled, undamaged self. Since art, then, is an essentially organic process in the development of human civilization, it must have a freedom of adjustment to the shifting circumstances; and there only can it be a factor and true index of civilization where, unrestrained by external authority, it can embody in its works the changing spirit of the centuries. This is the peculiar doctrine of Protestantism; and by so much does this form of Christianity promote and stimulate the highest art culture.

5. In the examination of the opinion that Protestantism has been lacking in æsthetic susceptibility and has been indifferent to the patronage and encouragement of religious art, it has been seen that at the beginning of the sixteenth century there was in the bosom of the Catholic Church a fearful moral degeneracy which tended to destroy all capacity for high art; that the wonderful revival in art which was then witnessed was not due to the fostering spirit of the Romish Church, but depended on influences foreign to this Church; that the comparative sparseness of art works, especially architectural monuments, in Northern Europe was not owing to an indifference to, or hatred of, art, but to extreme poverty, to

* See Horwicz, *Æsthetik*, p. 210.

wasting wars, and to the seething agitation of more absorbing questions; that the leading Reformers, so far from being rudely iconoclastic, were themselves warm lovers of art, and were only striving to save the worshiper from temptation to idolatry; that in some respects, as in architecture, sacred lyric, and sacred music, Protestantism has demonstrated an equal, if not superior, creative power; that while both systems stand almost equally closely related by history and practice to the encouragement of Christian art, their diverse views of anthropology and soteriology have caused them to assume different attitudes—Catholicism inclining more to the real and the objective, Protestantism to the ideal and the subjective; and, finally, that Protestantism, by its declaration and defense of the doctrine of individual responsibility and individual freedom, has thus recognized the only true conditions of a high and progressive Christian art.

ART. V.—MOHAMMEDANISM AND THE NEGRO RACE.*

THE following article was originally written by its author for the "Methodist Quarterly Review," but was intercepted in England, published in "Frazer's Magazine," and then sent in a copy of the Magazine to us for republication. We had a right to object to the discourtesy of thus reducing us to a second-hand position. But as Professor Blyden was himself innocent of this discourtesy, and his article furnishes matter which our readers would unquestionably desire to have before them, we present it in our pages. We may here add that Mr. Blyden's articles formerly published in our Quarterly have attracted attention by the richness of their scholarship and their grace of style. One of the notes appended to this article indicates the fact that he claims a purity of Negro blood, and insists that the word Negro, which he proudly claims to be legitimate, honorable, and needing no euphemistic substitute, is entitled to an initial capital N. We fully agree with W. H. Seward, that "no man is fit to be President who spells [or pronounces] Negro with two g's."—ED. METH. QUAR. REVIEW.

To students of general literature in Europe and the United States, until within the last few years, the Orientals most celebrated in religion or politics, in literature or learning, were known only by name. The Oriental world, to the student

* The author of this article, a Negro of the purest African blood, is Mr. Edward W. Blyden, Principal of the Presbyterian High School, Liberia, West Africa.—*Ed. Fraser's Mag.*

aiming at practical achievements, presented a field of so little promise that he scarcely ever ventured beyond a distant survey of what seemed to him a boundless and impracticable area. But, thanks to the exigencies of commerce, to philanthropic zeal, and to the scientific impulse, the East is daily getting to be "nearer seen and better known," not only in its outward life, but in those special aspects which, in religion and government, in war and policy, differentiate Eastern from Western races. It has been recently stated by a distinguished authority that "the intimate acquaintance with the languages, thoughts, history, and monuments of Eastern nations is no longer a luxury, but a necessity." And the visit, within the last ten years, of Oriental rulers to Europe—the Sultan of Turkey, the Khedive of Egypt, the Shah of Persia, and the Seyyid of Zanzibar—has stimulated in the popular mind a livelier curiosity as to the character, condition, and influence of Mohammedan countries.

Drawn away from the beaten track of Roman and Greek antiquity by considerations for the most part of a material nature, and wandering into paths which heretofore were trodden only by such enthusiastic pioneers as Sir William Jones, the Western student finds rewards far rarer and richer than he had anticipated. And even those who have not the opportunity of familiarizing themselves with Oriental languages find enough in translations—inadequate and unsatisfactory as they often are—to inspire them with a desire not only to increase their acquaintance with Eastern subjects, but to impart the knowledge they glean to others.

To the latter class belongs Mr. R. Bosworth Smith, the author of the work before us.* He informs us at the outset that "the only qualification he would venture to claim for himself," as a writer on Islam, "is that of a sympathetic interest in his subject," his work having been "derived in the main from the study of books in the European languages."

Mr. Bosworth Smith, who is a graduate of one of the English universities of only twelve years' standing, and, therefore,

* "Mohammed and Mohammedanism."—Lectures delivered at the Royal Institution of Great Britain in February and March, 1874. By R. Bosworth Smith, M.A., Assistant Master in Harrow School, late Fellow of Trinity College, Oxford. London: Smith, Elder, & Co.

we gather, a comparatively young man, may be regarded as one of the earliest collateral results of that increased activity in Oriental research which Dr. Birch has told us "marks the advance of civilization." And if he does stand upon the shoulders of Caussin de Perceval, Sprenger, Muir, and Deutsch, he may, without immodesty, claim to be taller than they; for we are very much mistaken if his book does not form an important starting point on the road to a more tolerant—if not sympathetic—view among popular readers of the chief religion of the Oriental world. The works of the writers just mentioned were designedly not popular, but written by scholars for scholars, maintaining or opposing theories for the most part of merely literary or historical significance. Mr. Bosworth Smith has brought to his work not only a thorough appreciation of the literary and historical questions involved, but an earnest respect "for the deeper problems of the human soul," cherishing the sound and fruitful conviction, which he strives to impart to his readers, "that Mohammedans may learn much from Christians, and yet remain Mohammedans; that Christians have something at least to learn from Mohammedans, which will make them not less but more Christian than they were before."

Mr. Bosworth Smith pursues the discussion of this important subject, which, as a labor of love, he entered upon with a degree of earnestness, perspicuity, catholicity, and force of reasoning that renders his work not only most instructive, but highly interesting as an indication of the tendency and direction of cultivated thought in England. He has entered into the spirit of Islam in a manner which, but for the antecedent labors of Lane, Sprenger, Deutsch, and Weil, would be astounding in a Western scholar and an Englishman.

Dean Stanley's lecture on the same subject, though marked by the breadth of view, generous impartiality, and geniality of spirit which so honorably distinguish all the writings of that scholarly and Christian divine, is fragmentary—necessarily limited in its range by the nature and scope of the work. To Mr. Bosworth Smith, then, must be awarded the credit not only of having fully, fairly, and freely investigated the practical features of Islam, but of having rendered a clear, unbiased, and unambiguous verdict, the influence of which, whether

acknowledged or not, must be felt throughout the literary world. Such works as those of Maracci, Prideaux, and White, are hereafter impossible in polemico-religious literature. No cultivated man, however inquisitorial his temperament, will ever, in the future, be tempted—or at least yield to the temptation — to subject any religious system to the Procrustean ordeal.

And, so far as Islam is concerned, scholars are arising within its ranks imbued with Western learning, and taking the part not only of defenders of their faith, but of interpreters between the Eastern and Western world. It has recently occasioned some surprise and comment that a Mohammedan writer should have written an able work in the English tongue, "challenging European and Christian thinkers on their own ground."* Since the appearance of Syed Ahmed's essays, another work has appeared in the English language, written by a young Mohammedan, in which he has briefly, temperately, and ably discussed the various subjects in relation to which Islam is usually assailed.†

But it is not only in recent days, as the writer in the "British Quarterly Review" would seem to imply, that Mohammedans have availed themselves of the power of the pen in defense of their faith. There have always been, and there are now, able controversialists among them altogether unknown to Western fame. The celebrated work of Dr. Pfander, the Mizan-al-Hakk, attacking the Mohammedan system, has been reviewed in the Arabic language by a Mohammedan scholar, Rahmat Allah, in a learned and incisive reply, in which he reveals a marvelous acquaintance with European literature. We have heard of no attempt at a rejoinder to the work of Rahmat Allah. We saw a copy of this book in the hands of a West African Mohammedan at Sierra Leone, who was reading and commenting upon it to a number of his co-religionists.

We are glad to notice that Mr. Bosworth Smith's book has been republished in the United States, and that the able article

* "British Quarterly Review" for January, 1872, in a Review of "A Series of Essays on the Life of Mohammed," etc. By Syed Ahmed Khan Bahador, C.S.I. Vol. i. London: Trübner & Co. 1870.

† "Critical Examination of the Life and Teachings of Mohammed." By Syed Ameer Ali Moulvi, M.A., LL.B., of the Inner Temple, Barrister-at-Law, etc. London: Williams & Norgate. 1873.

of Deutsch on Islam has been reproduced in the same volume as an appendix. They are fit companions—*par nobile fratrum.* The traveler, contemplating a visit to Mohammedan countries, or the theologian wishing to get a clear view of a religious system which is shaping the destiny of millions of the race, may now carry in his pocket a complete compendium of Mohammedan literature. If we except the very remarkable article on the "Historical Statements in the Koran," written in 1832 by the then stripling reviewer, Mr. J. Addison Alexander, of Princeton, and the able "Review of the Koran," by Professor Draper, of the New York University, in his "History of the Intellectual Development of Europe," American scholarship has as yet, as far as we are aware, produced nothing of importance in this branch of literature.

The portion of the interesting work now before us, which we propose more particularly to notice, is that part of the first lecture which refers to the character and influence of Islam in Western and Central Africa. Dean Stanley says:—

> It cannot be forgotten that Mohammedanism is the only higher religion which has hitherto made progress in the vast continent of Africa. Whatever may be the future fortunes of African Christianity, there can be no doubt that they will be long affected by its relations with the most fanatical and the most proselytizing portion of the Mussulman world in its Negro converts.*

If this view be correct, then the Christian world cannot be indifferent to the discussion of a subject so full of importance affecting one branch of the philanthropic interests into which the Christian Church, more than ever before, is now pouring its most eager life.†

Three streams of influence have always penetrated into Negroland: one from Egypt through Nubia to Bornou and Hausa; another from Abyssinia to Yoruba and Ashantee; the third from the Barbary States across the Desert to Timbuctoo. By the first two Egypt and Arabia exchanged their produc-

* "Eastern Church," p. 259.

† Mr. Monier Williams, the Boden Professor of Sanscrit at Oxford, has recently expressed the opinion, in a paper read at the Conference on Foreign Missions held at the Cannon-street Hotel in London, (June 22, 1875,) that, unless a fresh and powerful impulse is given to Christian missionary effort, Mohammedanism will speedily overrun the whole African continent.

tions for the raw materials of Soudan. By the third the ports of the Mediterranean, through the Great Desert, having Timbuctoo as a center, became outlets for the wealth of Nigritia. Even in the days of Herodotus there appears to have been intercourse between the region of the Tsad and the Mediterranean, and the valuable products collected at various centers by the itinerant traffic, which still flourishes in the interior, shared by numerous caravans, found their way by means of Phenician ships to different countries of Europe and the Levant.

Central Africa has never been cut off commercially from European and Asiatic intercourse. But it was not until the ninth century of the Christian era that any knowledge of the true God began to penetrate into Negroland. To Akbah, a distinguished Moslem general, belongs the credit or discredit of having subdued North Africa to Islam. He marched from Damascus at the head of ten thousand enthusiastic followers, and in a short time spread his conquests along the shores of North Africa, advancing to the very verge of the Atlantic, whose billows alone checked his westward career.* But the energy which could not proceed westward turned northward and southward. In its southern progress it crossed the formidable wastes of the Sahara, penetrated into Soudan, and established the center of its influence at Timbuctoo. In less than a century from that time several large Nigritian tribes had yielded to the influence of Islam; and it shaped so rapidly the ideas, the manners, and the history of those tribes, that when in the Middle Ages Ibn Batoutah, an Arab traveler, visited those regions, he found that Islam had taken firm root among several powerful peoples, had mastered their life and habits, and dominated their whole social and religious policy. Among the praiseworthy qualities which attracted his attention as a result of their conversion, he mentions their devotion to the study of the Koran, and relates the following illustrative incidents, which we give in the French version now before us:—

Ils ont un grand zèle pour apprendre par cœur le sublime Coran. Dans le cas où leurs enfants font preuve de négligence à cet égard, ils leur mettent des entraves aux pieds et ne les leur ôtent pas qu'ils ne le sachent réciter de mémoire. Le jour de la fête, étant entré chez le juge, et ayant vu ses enfants enchaînés, je lui dis:

* Gibbon's "Decline and Fall," etc., chap. li.

"Est-ce que tu ne les mettras pas en liberté?" Il repondit: "Je ne le ferai que lorsqu'ils sauront par cœur le Coran." Un autre jour, je passai devant un jeune nègre, beau de figure, revêtu d'habits superbes, et portant aux pieds une lourde chaîne. Je dis à la personne qui m'accompagnait: "Qu'a fait ce garçon? Est-ce qu'il a assassiné quelqu'un?" Le jeune nègre entendit mon propos et se mit à rire. On me dit: "Il a été enchaîné uniquement pour le forcer à apprendre le Coran de mémoire."*

Mohammedanism in Africa counts in its ranks the most energetic and enterprising tribes. It claims as adherents the only people who have any form of civil polity or bond of social organization. It has built and occupies the largest cities in the heart of the continent. Its laws regulate the most powerful kingdoms—Futah, Masina, Hausa, Bornou, Waday, Darfur, Kordofan, Senaar, etc. It produces and controls the most valuable commerce between Africa and foreign countries; it is daily gathering converts from the ranks of paganism; and it commands respect among all Africans wherever it is known, even where the people have not submitted to the sway of the Koran.

No one can travel any distance in the interior of West Africa without being struck by the different aspects of society in different localities, according as the population is pagan or Mohammedan. Not only is there a difference in the methods of government, but in the general regulations of society, and even in the amusements of the people. The love of noisy terpsichorean performances, so noticeable in pagan communities, disappears as the people come under the influence of Mohammedanism. It is not a fact that "when the sun goes down all Africa dances;" but it might be a fact if it were not for the influence of Islam. Those who would once have sought pleasure in the excitement of the tom-tom, now repair five times a day to the mosque, where they spend a quarter of an hour each time in devotional exercises. After the labors of the day they assemble in groups near the mosque to hear the Koran recited, or the Traditions or some other book read. In traversing the region of country between Sierra Leone and Futah Jallo in 1873, we passed through populous pagan towns, but the transition from these to Mohammedan districts was

* *Voyages d'Ibn Batoutah*, texte et traduction. Par Defremery et Sanguinetti, Paris, 1858, vol. iv, pp. 422, 423.

striking. When we left a pagan and entered a Mohammedan community, we at once noticed that we had entered a moral atmosphere widely separated from, and loftier far than, the one we had left. We discovered that the character, feelings, and conditions of the people were profoundly altered and improved.

It is evident that, whatever may be said of the Koran, as long as it is in advance of the Shamanism or Fetichism of the African tribes who accept it—and no one will doubt that Islam as a creed is an enormous advance not only on all idolatries, but on all systems of purely human origin—those tribes must advance beyond their primitive condition.

The Koran is, in its measure, an important educator. It exerts among a primitive people a wonderful influence. It has furnished to the adherents of its teachings in Africa a ground of union which has contributed vastly to their progress. Hausas, Foulahs, Mandingoes, Soosoos, Akus, can all read the same books and mingle in worship together, and there is to all one common authority and one ultimate umpirage. They are united by a common religious sentiment, by a common antagonism to paganism. Not only the sentiments, but the language, the words of the sacred book are held in the greatest reverence and esteem. And even where the ideas are not fully understood, the words seem to possess for them a nameless beauty and music, a subtle and indefinable charm, incomprehensible to those acquainted only with European languages. It is easy for those not acquainted with the language in which the Koran was written, and, therefore, judging altogether as outsiders, to indulge in depreciation of its merits.* Such critics lose sight of the fact that the Koran is a poetical composition, and a poetical composition of the earliest and most primitive kind, and that therefore its ideas and the language in which they are conveyed cannot well be separated. The genuine poet not only creates the conception, but the word which is its vehicle. The word becomes the inseparable drapery of the idea. Hence the highest poetry cannot be translated.

* The case cited by Dr. Mühleisen Arnold, in his work on Islam, of an Arab philosopher and unbeliever in Mohammed, who lived in the eighth century, depreciating the literary merits of the Koran, is no more in point as an argument against the book, it appears to us, than if a Mohammedan controversialist were to quote from Voltaire or Tom Paine against the Bible.

We see this in the numerous versions by which it has been sought in every age to reach the sense of the poetical portions of the Bible. No words yet furnished by Greek, Roman, or Teutonic literature have been fully adequate to bring out the subtle beauties of the Semitic original. Among Mohammedans written or printed translations of the Koran are discouraged. The Chinese, Hindoos, Persians, Turks, Mandingoes, Foulahs, etc., who have embraced Islam, speak in their "own tongues wherein they were born," but read the Koran in Arabic.

Mr. Bosworth Smith was right to commence his preparations for the valuable work he has written by a careful study of the Koran. But it is to be regretted that he had not access to the force and beauty of the original, which neither Sale, Kasimirsky, Lane, nor Rodwell have been able—though they labored hard to do so—to retain in their excellent translations. A distinguished Oriental scholar and critic says:—

> There can be no doubt that to understand thoroughly this wonderful book, the aid of those learned men, Arabs and others, who have devoted themselves to the careful study of it, is not only desirable, but necessary. . . . The subject is of sufficient importance to men of research to render it advisable that it should be examined from all points of view, for by no other means can we hope to obtain as clear an insight into the origin of Islam as by a careful study of the book which contain sits fundamental principles.*

To the outside world, easily swayed by superficial impressions, and carried away by matters of mere dramatic interest, there may be nothing attractive in the progress of Islam in Africa, because, as far as known to Western readers, the history of African Mohammedanism is deficient in great characters and in remarkable episodes. There has been, it is supposed, no controlling mind developed which has moved great masses of men. But the words of Horace are applicable here:—

> Omnes illacrimabiles
> Urgentur, ignotique longa
> Nocte, carent quia vate sacro.

It is not, however, that no bard has written, but they have had very few readers in Christian countries. To those acquainted with the interior of Africa—to the Mohammedan world of North

* W. Nassau Lees, in the preface to his edition of the "Commentary of Zamakhshari."

Africa and Arabia—it is well known that numerous characters have arisen in Africa—Negro Moslems—who have exerted no little influence in the military, political, and ecclesiastical affairs of Islam, not only in Africa but in the lands of their teachers. In the biographies of Ibn Khallikan are frequent notices of distinguished Negro Mohammedans. Koelle, in his *Polyglotta Africana*, gives a graphic account of the proceedings of the great Fodie, whose zeal, enthusiasm, and bravery spread Islam over a large portion of Nigritia.

One of the most remarkable characters who have influenced the history of the region of country between Timbuctoo and the West Coast was a native of Futah Toro, known as the Sheikh Omaru Al-Hajj. He is said to have been a Waleen,* a man of extraordinary endowments, of commanding presence, and great personal influence. He was educated by the Sheikh Tijani, a Moslem missionary from Arabia. Having spent several years under the instruction of this distinguished teacher, visiting Mecca in the meanwhile, he became profoundly learned in the Arabic language. After the death of his master he went twice to Mecca on pilgrimage. On his return to his country the second time, he undertook a series of proselytizing expeditions against the powerful pagan tribes on the east and south-east of Futah Toro. He conquered several powerful chiefs, and reduced their people to the faith of Islam. He banished paganism from Sego, and purified the practices of several Mohammedan districts which had become imbued with heathenish notions. He thus restored Jenne, and Hamd-Allahi, and was on his way to Timbuctoo, about ten years ago, when, through the treachery of the Arabs of that region, he was circumvented and killed at a town in Masina. One of his sons is now king of Sego, another rules over Hamd-Allahi, two of the largest cities in Central Africa.

Al-Hajj Omaru wrote many Arabic works in prose and poetry. His poems are recited and sung in every Mohammedan town and village, from Futah-town, in Sierra Leone, to Kano. His

* This word is used by the Mohammedans of Negroland in a peculiar sense. It means one called of God, and endowed with special gifts to exercise authority in ecclesiastical and sometimes political matters, inferior in official rank, according to their estimation, only to a prophet. Such men have, from time to time, arisen among African Mohammedans, and have carried out important reforms in Church and State.

memory is held in the greatest respect by all native students, and they attribute to him many extraordinary deeds, and see in his successful enterprises, literary and military, proofs of divine guidance.*

We have heard of numerous instances of these "half military, half religious geniuses," as Mr. Bosworth Smith calls them, "which Islam always seems capable of producing."

To the Mohammedans of Negro-land, far away from the complex civilization of European life, with its multifarious interests, the struggle for the ascendency of Islam is the one great object which should engage the attention of a rational being. It is a struggle between light and darkness, between knowledge and ignorance, between good and evil. The traditional enthusiasm of their faith makes them utterly indifferent to the sufferings of any who stand in the way of the dissemination of the truth, and patient of any evils they may have to endure in order to insure the triumph of their cause. "Paradise is under the shadow of swords," is one of their stimulating proverbs.

There is one passage in Mr. Bosworth Smith's book of which we do not think that the author, who it seems has not himself been in Africa, understood the full import, but which the Christian world, it appears to us, would do well to ponder. It is as follows:—

> Christian travelers, with every wish to think otherwise, have remarked that the Negro,† who accepts Mohammedanism, acquires at once a sense of the dignity of human nature not commonly found even among those who have been brought to accept Christianity.‡

Having enjoyed exceptional advantages for observation and comparison in the United States, the West Indies, South Amer-

* Report on the Expedition to Timbo made to the Governor of Sierra Leone, 1873. See also the "African Sketch-Book," by Winwood Reade, vol. i, p. 317.

† Mr. Bosworth Smith writes this word with a small *n;* but we do not see why, if it is used to designate one of the great families of man, it should not be entitled to the same distinction as such words as Indian, Hindoo, Chinaman, etc. Why give more dignity to the specific than to the general? Why write Ashantee, Congo, Mandingo, with capitals, and Negro, the generic appellation, with a small *n?* Is not this in deference to the sort of prejudice against which Mr. Smith himself protests?

‡ Lecture i, p. 32.

ica, Egypt, Syria, West and Central Africa,* we are compelled, however reluctantly, to indorse the statement made by Mr. Smith. And we are not surprised at his seizing hold in his researches of this most important fact and giving it such prominence—a prominence it richly deserves—in the discussion. Wherever the Negro is found in Christian lands, his leading trait is not docility, as has been often alleged, but servility. He is slow and unprogressive. Individuals here and there may be found of extraordinary intelligence, enterprise, and energy, but there is no Christian community of Negroes anywhere which is self-reliant and independent. Haïti and Liberia, so-called Negro Republics, are merely struggling for existence, and hold their own by the tolerance of the civilized powers.† On the other hand, there are numerous Negro Mohammedan communities and states in Africa which are self-reliant, productive, independent, and dominant, supporting, without the countenance or patronage of the parent country, Arabia, whence they derived them, their political, literary, and ecclesiastical institutions. In Sierra Leone, the Mohammedans, without any aid from government—imperial or local—or any contributions from Mecca or Constantinople, erect their mosques, keep up their religious services, conduct their schools, and contribute to the support of missionaries from Arabia, Morocco, or Futah, when they visit them. The same compliment cannot be paid to the Negro Christians of that settlement. The most enlightened native Christians there look forward with serious apprehension—and, perhaps, not without good grounds—to the time when, if ever, the instructions and influence from London will be withheld. An able paper on the "Condition and Wants of Liberia," by an intelligent and candid Liberian, has the following:—

> We want, as a people, the spirit of liberality. We have learned to depend upon foreign institutions to support our Churches. This should not be so. If, indeed, we have not enough of the Christian religion to induce us to contribute liberally to the cause of the

* The writer, of pure African extraction, was born in the West Indies, but received his educational training in Liberia, West Africa, where he has lived for twenty-five years.

† The "Official Journal," dated May 1, 1875, contained intelligence of a conspiracy which had just been suppressed, and a presidential decree banishing forty of the conspirators.

Gospel; if we have not enough zeal for the cause of Christ to make us willing to sacrifice time and money for its good, etc., we had as well give up Churches and religion. . . . I have known some persons to change a two cent piece so as to get one cent for the Church. Alas for such religion! alas for the Churches thus supported!*

In the recent Ashantee war the most trustworthy Negro troops were the Haussas, who are rigid Mohammedans. The West India Christian Negro troops were not relied on to the same extent.

Now, what has produced this difference in the effects of the two systems upon the Negro race? In reply, we remark generally that the difference must be attributed to the difference in the conditions under which the systems came to those of the Negro race who embraced the one or the other. Mohammedanism found its Negro converts at home in a state of freedom and independence of the teachers who brought it to them. When it was offered to them they were at liberty to choose for themselves. The Arab missionaries, whom we have met in the interior, go about without "purse or scrip," and disseminate their religion by quietly teaching the Koran. The native missionaries—Mandingoes and Foulahs—unite with the propagation of their faith active trading. Wherever they go they produce the impression that they are not preachers only, but traders; but, on the other hand, that they are not traders merely, but preachers. And in this way, silently and almost unobtrusively, they are causing princes to become obedient disciples and zealous propagators of Islam. Their converts, as a general thing, become Moslems from choice and conviction, and bring all the manliness of their former condition to the maintenance and support of their new creed.

When the religion was first introduced it found the people possessing all the elements and enjoying all the privileges of an untrammeled manhood. They received it as giving them additional power to exert an influence in the world. It sent them forth as the guides and instructors of their less favored neighbors, and endowed them with the self-respect which men feel who acknowledge no superior. While it brought them a

* The Annual Address delivered before the City Council and Citizens of Monrovia, July 27, 1874, by Jehu T. Dimery.

great deal that was absolutely new, and inspired them with spiritual feelings to which they had before been utter strangers, it strengthened and hastened certain tendencies to independence and self-reliance which were already at work. Their local institutions were not destroyed by the Arab influence introduced. They only assumed new forms, and adapted themselves to the new teachings. In all thriving Mohammedan communities, in West and Central Africa, it may be noticed that the Arab superstructure has been superimposed on a permanent indigenous substructure; so that what really took place, when the Arab met the Negro in his own home, was a healthy amalgamation, and not an absorption or an undue repression.

The Oriental aspect of Islam has become largely modified in Negroland, not, as is too generally supposed, by a degrading compromise with the pagan superstitions, but by shaping many of its traditional customs to suit the milder and more conciliatory disposition of the Negro. As long as Timbuctoo, which was but a continuation of Morocco, retained its ascendency, Islam kept up its strictly Arabian aspect; but since the seat of literary activity and ecclesiastical influence has been transferred to Kuka, and since Kano has become the commercial center—two purely Negro cities grown up under Moslem influence—and since the religion has taken root among the large indigenous communities near the source of the Niger, it has been largely affected by the geographical and racial influences to which it has been exposed. The absence of political pressure has permitted native peculiarities to manifest themselves, and to take an effective part in the work of assimilating the new elements.

Christianity, on the other hand, came to the Negro as a slave, or at least as a subject race in a foreign land. Along with the Christian teaching, he and his children received lessons of their utter and permanent inferiority and subordination to their instructors, to whom they stood in the relation of chattels. Christianity took them fresh from the barbarism of ages, and forced them to embrace its tenets. The religion of Jesus was embraced by them as the only source of consolation in their deep disasters. In their abject miseries, keen anguish, and hopeless suffering, they seized upon it as promising a country where, after the unexampled sorrows of this life, "the wicked

cease from troubling, and the weary are at rest." It found them down-trodden, oppressed, scorned; it soothed their sufferings, subdued their hearts, and pointed them, in its exhaustless sympathy, to the "Man of Sorrows, and acquainted with grief." In their condition of outcasts and pariahs, it directed their aspirations to a heavenly and eternal citizenship; it put new songs in their mouths—those melodies inimitable to the rest of the world—which, from the lips of emancipated slaves, have recently charmed the ears and captivated the hearts of royalty and nobles in Europe by a tenderness, a sweetness, an earnestness, and a solemnity born of adversity in the house of bondage. A popular London preacher says:—

> The Negro is more really musical than the Englishman. . . . Singing very often merrily with the tears wet upon his ebony cheek, no record of his joy or sorrow passed unaccompanied by a cry of melody, or a wail of plaintive and harmonious melancholy. If we could divest ourselves of prejudice, the songs that float down the Ohio River are one in feeling and character with the songs of the Hebrew captives by the waters of Babylon. We find in them the same tale of bereavement and separation, the same irreparable sorrow, the same wild tenderness and passionate sweetness, like music in the night.*

These are great and precious advantages; but, nevertheless, owing to the physical, mental, and social pressure under which the Africans received these influences of Christianity, their development was necessarily partial and one-sided, cramped and abnormal. All tendencies to independent individuality were repressed and destroyed. Their ideas and aspirations could be expressed only in conformity with the views and tastes of those who held rule over them. All avenues to intellectual improvement were closed against them, and they were doomed to perpetual ignorance.

Mohammedanism and learning to the Moslem Negro were coeval. No sooner was he converted than he was taught to read, and the importance of knowledge was impressed upon him. The Christian Negro came in contact with mental and physical proscription and the religion of Christ contemporaneously. If the Mohammedan Negro had at any time to choose between the Koran and the sword, when he chose the former he was allowed to wield the latter as the equal of any

* Rev. H. R. Haweis in "Music and Morals," p. 500. London, 1874.

other Moslem; but no amount of allegiance to the Gospel relieved the Christian Negro from the degradation of wearing the chain which he received with it, or rescued him from the political and, in a measure, ecclesiastical proscription which he still undergoes in all the countries of his exile.* Everywhere in Christian lands he plays, at the present moment, the part of the slave, ape, or puppet. Only a few here and there rise above the general degradation, and these become targets to their unappreciative brethren—

Apparent rari nantes in gurgite vasto.

Is it any wonder, then, that "Christian travelers, with every wish to think otherwise," in commenting upon the diffference between Christian and Mohammedan Negroes, with respect to true manliness, must do so to the disadvantage of the former?

Another reason for the superior manliness and *amour propre* of Negro Mohammedans may be found in the fact that, unlike their Christian brethren, they have not been trained under the depressing influence of Aryan art. Deutsch says:—

The Shemites from some strange idiosyncrasy, perpetuated by religious ordinances, abhorred, all of them, at certain stages, the making visible pictures of things they revered, loved, or worshiped.†

The Second Commandment, with Mussulmans as with Jews, is construed literally into the prohibition of all representations of living creatures of all kinds; not merely in sacred places, but every-where.‡ Josephus tells us that the Jews would not even suffer the image of the emperor, which was represented on the eagles of the soldiers.§ The early Christian Fathers believed that painting and sculpture were forbidden by the Scriptures, and that they were therefore wicked arts. Among the Mohammedans of Negroland it is considered a sin to make even the rudest representation of any living thing on the ground or on the side of a house. We shall never forget the disgust with which a Mandingo from Kankan, who was for the first time visiting the seaboard at Monrovia, turned from a marble figure

* For an interesting discussion on this subject from the pen of a Negro, see Tanner's "Apology for African Methodism" in the United States.

† "Literary Remains," p. 161.

‡ "Mischat ul-Masabih," vol. ii, p. 368. § "Antiquities, xviii-iii, 1, etc.

in the cemetery, through which we were showing him, exclaiming, *Amâl Shaitân! amâl Shâitan!*—the work of Satan.*

No one can deny the great esthetic and moral advantages which have accrued to the Caucasian race from Christian art, through all its stages of development, from the Good Shepherd of the Catacombs to the Transfiguration of Raphael, from rough mosaics to the inexpressible delicacy and beauty of Giotto and Fra Angelico.† But to the Negro all these exquisite representations exhibited only the physical characteristics of a foreign race; and, while they tended to quicken the tastes and refine the sensibilities of that race, they had only a depressing influence upon the Negro, who felt that he had neither part nor lot, so far as his physical character was concerned, in those splendid representations. A strict adherence to the letter of the second commandment would have been no drawback to the Negro. To him the painting and sculpture of Europe, as instruments of education, have been worse than failures. They have really raised barriers in the way of his normal development. They have set before him models for imitation; and his very effort to conform to the canons of taste thus practically suggested, has impaired, if not destroyed, his self-respect, and made him the weakling and creeper which he appears in Christian lands. It was our lot not long since to hear an illiterate Negro in a prayer-meeting in New York entreat the Deity to extend his "lily white hands" and bless the waiting congregation. Another,‡ with no greater amount of culture, preaching from 1 John iii, 2, "We shall be like him," etc., etc., exclaimed, "Brethren, imagine a beautiful white man with blue eyes, rosy cheeks, and flaxen hair, and we shall be like him." The conceptions of these worshipers were what they had gathered from plastic and pictorial representations, as well as from the characteristics of the dominant race around them. The Mohammedan Negro, who is not familiar with such representations, sees God in the great men of his own country. The saying is attributed to an

* See Koran, v. 92.

† See a paper on the Roman Catacombs, etc., read by Dean Stanley before the Royal Institution, May 29, 1874.

‡ The putting forward of thoroughly illiterate men to expound the Scriptures among Negro Christians has been another great drawback to their proper development.

ancient philosopher,* that if horses, oxen, and lions could paint they would certainly make gods in their own image:—

> If oxen or lions had hands, and could work in man's fashion,
> And trace out with chisel and brush their conception of Godhead,
> Then would horses depict gods like horses, and oxen like oxen,
> Each kind the divine with its own form and nature endowing.

This is no doubt true, and the Negro who grew up normally would certainly not be inferior to lions, horses, and oxen. The Christian Negro, abnormal in his development, pictures God and all beings great in moral and intellectual qualities with the physical characteristics of Europeans, and deems it an honor if he can approximate by a mixture of his blood, however irregularly achieved, in outward appearance, at least, to the ideal thus forced upon him of the physical accompaniments of all excellence. In this way he loses that "sense of the dignity of human nature" observable in his Mohammedan brother.

A third very important influence which has retarded the development of the Christian Negro may be found in the social and literary pressure which he has undergone. It is not too much to say that the popular literature of the Christian world, since the discovery of America, or at least for the last two hundred years, has been anti-Negro. The Mohammedan Negro has felt nothing of the withering power of caste. There is nothing in his color or race to debar him from the highest privileges, social or political, to which any other Moslem can attain. The slave who becomes a Mohammedan is free.† Mohammedan history abounds with examples of distinguished Negroes. The eloquent Adzân, or Call to Prayer, which to this day summons at the same hours millions of the human race to their devotions, was first uttered by a Negro, Bilâl by name, whom Mohammed, in obedience to a dream, appointed the first Muezzin or Crier.‡ And it has been remarked that even Alexander the Great is in Asia an unknown personage by the side of this honored Negro. Mr. Muir notices the inflexible constancy of Bilâl to the faith of Islam under the severest trials.§ Ibn Khallikan mentions a celebrated Negro khalif,

* Xenophanes of Colophon, (six centuries, B. C.)

† Ockley's "History of the Saracens," sixth edition, London, 1871, p. 14.

‡ Muir's "Life of Mohammed," vol. iii, p. 54.

§ Ibid, vol. ii, p. 129.

who reigned at Bagdad in the ninth century.* He describes him as a man of great merit, and a perfect scholar. None of the sons of khalifs spoke with greater propriety and elegance, or composed verses with greater ability. The following lines were addressed to him by a contemporary poet:—

Blackness of skin cannot degrade an ingenious mind, or lessen the worth of the scholar or the wit. Let blackness claim the color of your body; I claim as mine your fair and candid soul.

The poet Abu Ishak Assabi, who lived in the tenth century, had a black slave named Yumna, to whom he was greatly attached, and on whom he made some remarkable verses which are much quoted by Moslems. Notice the following:—

The dark-skinned Yumna said to one whose color equals the whiteness of the eye, "Why should your face boast its white complexion? Do you think that by so clear a tint it gains additional merit? Were a mole of my color on that face it would adorn it; but one of your color on my cheek would disfigure me."

Here is another:—

Black misbecomes you not; by it you are increased in beauty: black is the only color princes wear. Were you not mine, I should purchase you with all my wealth. Did I not possess you, I should give my life to obtain you.†

Ibn Muslimeh, an enthusiastic lover, exclaims, "If a mole be set in an ugly cheek it endows it with beauty and grace; how then should the heart-stricken be blamed for looking upon his mistress as a mole all over?‡

Mr. Gifford Palgrave, whose travels in Eastern countries have no doubt diminished the sensitiveness of his Western prejudices, concludes his brilliant "Essays on Eastern Questions" with a poem composed by a Negress in memory of her celebrated semi-Arab son, who had perished in one of his daring adventures.

Now, it must be evident that Negroes trained under the influence of such a social and literary atmosphere must have a deeper self-respect and higher views of the dignity of human nature than those trained under the blighting influence of

* "Biographies of Ibn Khallikan," translated by Baron de Slane, vol. i, p. 18.

† Ibn Khallikan, vol. i, p. 32.

‡ Chenery's Translation of the "Assemblies of Hariri," vol. i, p. 345.

caste, and under the guidance of a literature in which it has been the fashion for more than two hundred years to caricature the African, to ridicule his personal peculiarities, and to impress him with a sense of perpetual and hopeless inferiority. Christian literature has nothing to show on behalf of the Negro comparable to Mohammedan literature; and there is nothing in Mohammedan literature corresponding to the Negro—or "nigger," as even a liberal clergyman like Mr. Haweis will call him *—of Christian caricaturists. A distinguished American scholar and thinker has noticed this. He says:—

> The black man in literature is either a weakling or caricature. The comic side of him alone comes into view. The single sonnet of Wordsworth upon the chieftain Toussaint, and the "sparkles dire of fierce, vindictive song" from the American Whittier, are almost the only literary allusions to the sublime and tragic elements in the Negro's nature and condition; certainly the only allusions that, without any abatement and introduction of ludicrous traits, ally him *solely* with human
>
> . . . Exultations, agonies,
> And love, and man's unconquerable mind.†

No one will charge the Negro Mohammedans with giving ground for the notion, put forward recently from a very distinguished source, that the African entertains "a superstitious awe and dread of the white man." Ibn Batoutah, cited above, though a Mohammedan, experienced no greater respect among the Moslems of Negroland on account of his color than a Negro in the same position would have received. He complains of the cool and haughty bearing of a certain Negro prince toward himself and a number of European or Arab traders who appeared in the royal presence. "It was then," he says, "that I regretted having entered the country of the Negroes on account of their bad education, and the little regard they have for white men." And what was the evidence of this "bad education and little regard for white men?" The chief chose to speak to them through a third party, "although they were

* "Music and Morals," p. 550.

† Professor W. G. T. Shedd, in an Address delivered before the Massachusetts Colonization Society, Boston, May 27, 1857. The remarkable address of Wendell Phillips on Toussaint L'Overture must not be forgotten. Mr. Phillips is the only American orator who has had the temerity to lavish flowers of a brilliant rhetoric in adorning the memory of a Negro.

very near him." "This was done," observes the sensitive traveler, "solely on account of his contempt" for them. Réné Caillié, the French traveler, who made the journey from West Africa to Morocco, *via* Timbuctoo, was compelled to travel in strict disguise as a poor Moslem. His sojourn in Timbuctoo was of only fourteen days; and, as he was in constant danger of being discovered, he could neither move about freely nor note down all that he wished. Even Barth was obliged, for a short time, to adopt the character of a Moslem. Of course these things occurred before the days of Sir Garnet Wolseley, who, in a grave official document, thought it necessary to reassure his troops in the following terms:—

> It must never be forgotten by our soldiers that Providence has implanted in the heart of every native of Africa a superstitious awe and dread of the white man that prevents the Negro from daring to meet us face to face in combat.*

But Sir Garnet also deemed it important to bring to bear against these awe-struck Negroes armed with cheap flint muskets all the appliances of modern warfare, and no doubt bore in mind the Roman poet's advice—*Ne crede colori.* As *a ruse de guerre*—a military expedient—the statement served its purpose, and is one among the many evidences of Sir Garnet's skill and readiness in not only availing himself of advantageous elements in the situation, but of creating them if they do not exist. In this case he adroitly played upon the "superstition" of white men:—

> An dolus an virtus, quis in hoste requirat?

A cool and discriminating critic at home, however, at the close of the war assured us that, "without arms of precision, guns and rockets, and English skill and discipline, no invader could have made his way to Coomassie."

Had Sir Garnet, even before his practical experience, read the history of the great Civil War in America, he would have found in the thrilling records of many a desperate encounter, in which the Negro proved himself no mean antagonist when he met the white man "face to face in combat," materials for imposing a check upon that exuberance of imagination which

* Notes issued for use of the troops by order of Sir Garnet Wolseley, dated Cape Coast Castle, December 20, 1873.

tempted him to the sweeping assertion that the Negro in Christian lands, and all along the coast where he has been under the training of the white man, exhibits a cringing and servile spirit; but this, as we have endeavored to show, is the natural result of that habit of mind which it was the interest of his masters to impress upon him. Sir Garnet's dogma is only one of the innumerable lessons which the Negro is constantly made to imbibe, even at times from his religious guides and teachers,* the tendency to which is to blunt his "sense of the dignity of human nature."

Another very important element which has given the Mohammedan Negro the advantage over his Christian brother is, the more complete sympathy which has always existed between him and his foreign teacher. Mr. Bosworth Smith says:—

> The Mussulman missionaries exhibit a forbearance, a sympathy, and a respect for native customs and prejudices, and even for their more harmless beliefs, which is no doubt one reason of their success, and which our own missionaries and schoolmasters would do well to imitate.—Page 34.

Long prior to the rise of Islam, as we have seen above, the Arab merchant had been in communication with the interior of Africa, and had opened the way for the Arab missionary. When, therefore, the Moslem missionary came as the propagator of a higher religion than any that had been known, he did not enter the country as a stranger. The political and social institutions of the Arabs had already been tried and found suitable to the wants and tastes of the Negro tribes; indeed, the two peoples, if not of cognate origin, have by protracted intercommunication, and by the similarity of the physical influences which have for ages operated upon them, become similar in tastes; and it was not difficult for the Arabs to conform to a great extent to the social and domestic customs of the Africans. The Moslem missionary often brought to the aid of his preaching the influence of social and domestic relationships—an influence which in all efforts to convert a people is not to be entirely

* See an article on the "Negro" in the "Church Missionary Intelligencer" for August, 1873. The special correspondent of the "Daily News" at Cape Coast, under date of Oct. 2, 1873, speaks of the native chiefs as follows: "There is nothing that seems to signify power about their dignity; and knowing, as we did, that it has been our policy on the Coast for years to deprive these chiefs of all real influence, their very solemnity of manner left on me an impression of the theatrical."

ignored. "The conversion of the Russian nation," we are told by Dean Stanley, "was effected, not by the preaching of the Byzantine clergy, but by the marriage of a Byzantine princess."* So the Arab missionaries often entered into the bonds of wedlock with the daughters of Negroland;† and by their teaching, by their intelligence, by their intermarriages with the natives, by the trade and generosity of their merchants, they enlisted so many interests and such deep sympathies, that they rapidly took abiding root in the country. Some of the brightest names in the annals not only of Islamitic but of pre-Islamitic literature, are those of the descendants of Arabs and Africans. One of the authors of the "*Muallakat*," for instance, was half Arab and half Negro.

The sympathy, therefore, between the Arab missionary and the African is more complete than that between the European and the Negro. With every wish, no doubt, to the contrary, the European seldom or never gets over the feeling of distance, if not of repulsion, which he experiences on first seeing the Negro.‡ While he joyfully admits the Negro to be his brother, having the same nature in all its essential attributes, still, owing to the diversity in type and color, he naturally concludes that the inferiority which to him appears on the surface must extend deeper than the skin, and affect the soul. Therefore, very often in spite of himself, he stands off from his African convert, even when, under his training, he has made considerable advance in civilization and the arts. And especially is this the case in West Africa, where, living among large masses of his countrymen, the African Christian, who, from the pressure of circumstances has been forced into European customs,

* "Eastern Church," p. 34.

† Mr. Palgrave tells us that intermarriages between Arabs and Negroes have been at no period rare or abnormal; to such admixtures, indeed, the East owes not a few of her best celebrities.—*Essays on Eastern Questions*, p. 337.

‡ Bishop Heber, in one of his letters written on his first arrival in India, says: "There is, indeed, something in a Negro which requires long habit to reconcile the eye to him, but for this the features and hair, far more than the color, are responsible.—*Life of Heber*, by Taylor, second edition, p. 147. And what this distinguished prelate experienced and so candidly avowed, must be experienced in a still greater degree by minds of less caliber and less culture than his. "The more ignorant the whites are," says Dr. Charles Hodge, of Princeton, New Jersey, "the more violent and unreasonable are their prejudices on this subject."—*Hodge's Essays and Reviews*, p. 519.

presents very often to the foreign observer, in contrast with his native brethren, an artificial and absurd appearance. And the missionary, looking from a comfortable social distance, surveys the Europeanized native, sometimes with pity, sometimes with dismay, seldom with thorough sympathy. He

> "Back recoils, he knows not why
> Even at the sound himself has made."

Or like the stream in Racine, at the sight of the monster it had washed to the shore:—

> Le flot qui l'apportat recule épouvanté. *

The African convert, under such practical teaching, looking upon his instructor as superior to himself—or at least *apart* from himself, not only in spiritual and temporal knowledge, but in every other respect—acquires a very low opinion of himself, learns to depreciate and deprecate his own personal characteristics, and loses that "sense of the dignity of human nature" which observant travelers have noticed in the Mohammedan Negro.

The Arab missionary, on the other hand, often of the very complexion of his hearer, does not "require any long habit to reconcile the eye to him." He takes up his abode in Negroland often for life, and, mingling his blood with that of the inhabitants, succeeds, in the most natural manner, in ingrafting Mohammedan religion and learning upon the ignorance and simplicity of the people. Innocent of the scientific attainments of the day, and with no other apparatus than his portable bed and dingy manuscripts, he may be inferior to the theological and classical scholar just from college in Europe or America, but he has the advantage of speaking to the people in a sympathetic and perfectly intelligible language.

We will conclude with one more extract from Mr. Bosworth Smith:—

> That Mohammedanism may, when mutual misunderstandings are removed, be elevated, chastened, purified by Christian influences and a Christian spirit, and that evils such as the slave-trade, which are really foreign to its nature, can be put down by the heroic efforts of Christian philanthropists, I do not doubt; and I can, therefore, look forward, if with something of anxiety, with

* Racine: "*Phèdre*," Acte V, Scène 6.

still more of hope, to what seems the destiny of Africa, that Paganism and Devil-worship will die out, and that the main part of the continent, if it cannot become Christian, will become, what is next best to it, Mohammedan.—P. 40.

West Africa has been in contact with Christianity for three hundred years, and not one single tribe, *as a tribe*, has become Christian. Nor has any influential chief yet adopted the religion brought by the European missionary. From Gambia to Gaboon, the native rulers, in constant intercourse with Christians, and in the vicinity of Christian settlements, still conduct their government according to the customs of their fathers, where those customs have not been altered or modified by Mohammedan influence. The Alkali of Port Loko, and the chief of Bullom, under the shadow of Sierra Leone, are *quasi* Mohammedan. The native chiefs of Cape Coast and Lagos are pagans.* So in the territory ruled by Liberia the native chiefs in the four counties—Mesurado, Bassa, Sinou, and Cape Palmas—are pagans. There is not a single spot along the whole coast, except, perhaps, the little island of Corisco, where Christianity has taken any hold among large numbers of the indigenous tribes.

But we do not believe that these tribes are hopelessly inaccessible to the influence of the religion of the Gospel. We believe that "when mutual misunderstandings are removed;" when the race is better understood; when the effort at indiscriminate Europeanizing ceases; when the missionary keeps before his mind—if he knows, or learns if he does not know—that "the idiosyncrasy of a people is a sacred gift, given, for some Divine purpose, to be sacredly cherished and patiently unfolded;"† there will be nothing to prevent Christianity from spreading among the pagan tribes, and from eventually uprooting the imperfect Mohammedanism which so extensively prevails. In the meantime, we ought not to grudge the Africans the glimpses of truth which they catch from the Koran; for "a knowledge of a part is better than ignorance of the whole."‡

* See Governor Pope Hennessy's Blue Book Report. Papers relating to her Majesty's Colonial Possessions. Part II, 1873, 2d division.

† Compare the views of Stopford Brooke in Sermons on "Christ in Modern Life," p. 58.

‡ Abu-l-Fida.

A singular anxiety seems to prevail in certain quarters to disparage and depress the character of Mohammedan influence, especially in Africa, by endeavoring to show that wherever it prevails it erects an insurmountable barrier to our further progress—that it produces a far greater than Chinese immobility. We are surprised that a writer, apparently so well informed as the author of the article on Mohammed, in the *Birtish Quarterly Review* for January, 1872, should have put forward the following:—

> Islam is a reform which has stifled all other reforms. It is a reform which has chained down every nation which has accepted it at a certain stage of moral and political growth.

In keeping with this is a remarkable statement of Mr. Freeman's in his "History and Conquest of the Saracens," a work described by a recent subtle and eloquent writer as "more equitable and conscientious than Gibbon's!" Mr. Freeman says that Mohammedanism has "consecrated despotism; it has consecrated polygamy; it has consecrated slavery;" and Dean Church, to whom we are indebted for the quotation, not only indorses it, but adds, "it has done this directly, in virtue of its being a religion, a religious reform." *

A Mohammedan writer, taking the same superficial view of the effects of Christianity, and with the same love for epigrammatic terseness, might say, "Christianity has consecrated drunkenness; it has consecrated Negro slavery; it has consecrated war;" and he might gather ample materials for sustaining his position from the history of Christianity during the last three hundred years, especially in the Western hemisphere. When we see so many evils known to be antagonistic to the Christian religion still, after eighteen hundred years, prevalent in Christian lands, why should Mahommedanism be so assailed because, during twelve hundred years of its existence, it has not extirpated from the countries in which it prevails all social evils? Must we not suppose, that as with other creeds, so with Islam, its theology is capable of being made subservient to worldly interests? May we not believe that many of the evils in lands under its sway are due, not to its teachings, but

* Lectures on the "Influences of Christianity," etc. By R. W. Church, M.A., Dean of St. Paul's, p. 8.

to human passions? "As late as the fifteenth century," we are told by Mr. Maclear, "the Church in Europe was engaged in eradicating the remains of Sclavonic heathenism, and protesting against a rude Fetishism and serpent worship." *

It is to be regretted that statements such as those referred to above continue to be made by men whose character, position, and literary ability make them the guides of thousands. They tend to perpetuate in the Christian Church the feeling of distrust in any effort to evangelize the Mohammedan—to keep alive the suspicion that "the successes of the Mohammedan missionary condemn beforehand the labors of the Christian missionary to be in vain"—feelings with a closer acquaintance with the facts—we speak especially for Africa—does not justify. We are satisfied, however, that with the light which, increasing every day, is now being thrown upon the religion of Mohammed, writings based more upon the opinions and theories of the Middle Ages—as Mr. Bosworth Smith has so well shown—than upon the demonstrated facts of to-day, are almost sure, in proportion to the growth of a more accurate knowledge and a more thoroughly discriminating and literary appreciation of Islam, to be riddled out into oblivion as inappropriate platitudes and barren superfluities.†

We entertain the deliberate conviction—gathered not from reading at home, but from travels among the people—that, whatever it may be in other lands, in Africa the work of Islam is preliminary and preparatory. Just as Ishmael came before Isaac in the history of the great Semitic families, so here the descendant of Ishmael has come before the illustrious descendants of Isaac. The African Mohammedans, as far as we have observed, are tolerant and accessible, anxious for light and improvement from any quarter. They are willing to have Christian schools in their towns, to have the Christian Scriptures circulated among them, and to share with Christians the work of reclaiming the pagans. ‡

* "Apostles of Mediæval Europe," p. 32.

† See an able discussion of this subject in Syed Ameer Ali's "Life and Teachings of Mohammed," chap. xv.

‡ Bishop Crowther, in his report for 1874, says: "I have not met with a stern opposer of Christianity, as far as I had conversation with Mohammedans up the Niger.... The reception of an Arabic Bible, which was presented to the Emir of Nupe from the Church Missionary Society, with a childlike glee, in the presence of his court-

In view, then, of the work which Islam has already accomplished for Africa and the Negro race, and the work which it may yet accomplish, we may express the belief of Möhler, quoted by the *Guardian*, (Nov. 4, 1874,) that "one day the true laborers may find (in Africa) a harvest ready for their reaping, and the Gospel speed thither on its way rejoicing, and Mohamed prove a servant of Christ." Till then, all earnest Christians may consistently join in the prayer of Abraham, adopted in the liturgy of the Moravian Church: "O, that Ishmael may live before Thee!" EDWARD W. BLYDEN.

ART. VI.—THE NEBULAR HYPOTHESIS AND MODERN GENESIS.*

SINCE the speculations of the evolutionists have been advanced with such boldness and plausibility, the nebular hypothesis has assumed an importance which it did not possess in the time of Herschell and Laplace. It is, in fact, the first link in the development theory by which it is attempted to bind together all nature in a rigid system of materialism, forever excluding the interposition of mind and the idea of a divine cosmos. Final cause is pronounced a chimera, and the first great cause is remanded to the sphere of the unknown.

The heavens no longer declare the "glory of God," but the transcendent genius of Newton and Laplace. The responsive cry of the angels in the vision of Isaiah, "Holy, holy, holy, is the Lord of hosts: the whole earth is full of his glory," is

iers, was a proof that this people desire to hear and search after the truth. Another copy was sent through him to Alihu, the king of Ilorin, who is also an Arabic scholar. . . . In all our religious conversations with these Mohammedans we never met with an obstinate disputer, or a bigoted denial of what we read or said to them."—"*Monthly Reporter*" *of Church Missionary Society, February*, 1875.

* *Mécanique Céleste* and *Systeme du Monde.* Laplace.——The Modern Genesis. Rev. W. B. Slaughter. Methodist Book Concern.——Poisson's Mechanics.——Climate and Time. Professor Cerall.——Correlation and Conservation of Force. Youmans.——Lectures on Some Recent Advances in Physical Science. Professor Tait.——Sketches of Creation and Geology of the Stars. Winchell.——Schellen's Spectrum Analysis.——Smithsonian Contribution to Knowledge, vol. xviii. Stockwell.——American Journal of Science, 1860, 1874, vol. ix.——Natural Science Review, 1875.——Popular Science Monthly.——Proctor's Lectures in America.

drowned by the vociferous chorus of the scientific world celebrating the *wonderful* observations of Darwin, the *hasty* generalizations of Huxley, and the hazy speculations of Spencer. In his "System of the World," Laplace, or at least his translator, writes the word "Geometer" with a capital "G;" while "nature," as the grand source of all things, is spelled with a small "n." In the same irreverent spirit the great Geometer responded to Napoleon, who asked him how he could write such a work as *Mécanique Céleste* without a recognition of God, "Monsieur, I have no need of such a hypothesis."

It is not improbable that the nebular hypothesis suggested to Herbert Spencer his wonderful definition of evolution. "It is," says he, "a change from an indefinite incoherent homogeneity into a definite coherent heterogeneity through continuous differentiation and integration." The principles on which the marvelous transformations are accomplished, are the "instability of the homogeneous," the "multiplication of effects," and the "integration of correspondences." According to the nebular hypothesis, we have first an extended cloud-mass, incoherent, indefinite, and homogeneous, out of which the cosmos is to be evolved by the multiplication of effects and the integration of correspondences. The earlier theorists assumed the existence of rotary motion, while modern speculation attempts to account for this motion on the principle of the "inherent gravitative force of matter." Motion being initiated in the nebula, it will be accelerated on account of the particles drawing nearer to its center by condensation resulting from cooling, on the same principle that the uncompensated balance-wheel of a watch will vibrate faster in winter than in summer. As this motion increases the particles of matter at all latitudes press from both hemispheres toward the equator, forming an oblate spheroid. When the centrifugal force, or tendency to fly off, becomes greater than the centripetal force, or the attraction toward the center of the mass, a ring is separated at the equator, and eventually broken into fragments. This is what Spencer calls "differentiation." These fragments, obeying the law of gravity, unite in most cases to form a planet or satellite. This is "integration." The outer part of the ring having a greater motion than the inner part, the differentiated body will revolve about an axis. This body passes through the same

stages of development as the original mass, hence the satellites. This process is not carried on *ad infinitum*, resulting in tribes, households, and families, in the planetary realm, because, after a while, the affection of the parent becomes stronger than the prodigal tendencies of the child. Thus out of a single homogeneous mass we have the heterogeneous solar system, with its sun as the residuum of the original nebula, together with the planets, the asteroids, and satellites.

The Origin of the Nebular Hypothesis.—Laplace, a celebrated French astronomer and mathematician, already mentioned, advanced this theory of planetary genesis in its definite form, though the speculative views of Lambert and Kant led them to the adoption of a nebular hypothesis, and the idea of a perpetual development in the regions of space. Sir William Herschell embraced similar views in relation to the existence of a self-luminous substance, of a highly attenuated nature, distributed through the celestial regions. But he made no attempt to extend his hypothesis to a cosmogony of our solar system. If, therefore, this hypothesis is restricted to the view which professes to explain the genesis of our solar system, it is only analogically related to the loftier speculations of Herschell in regard to the processes of star-formation going on in the stellar spaces.

With a modesty becoming true philosophy, which distinguishes speculation from scientific facts, Laplace suggested his hypothesis, "which," he says, "I present with that diffidence which ought always to attach to whatever is not the result of observation and computation." In harmony with this spirit he did not give this theory place in the body of his system of philosophy, but added it in the form of a note in his "System of the World"—a work comprising the *results* of celestial mechanics and adapted to the popular mind. That he never regarded this theory as any thing more than a plausible supposition, unsupported by mathematical reasoning, is manifest from the following phraseology: "If the *conjectures*, which I have proposed on the origin of the planetary system, have any foundation," etc Among the principles of his philosophy may be found a very different theory of planetary motions. He says, in accounting for planetary motions, "Thus to explain the double motion of rotation and translation of the earth,

it is sufficient to suppose that at the beginning it received an impulse of which the direction was at a small distance from its center of gravity."

What were the chief considerations which recommended this hypothesis to the mind of Laplace, and what is its relation to the facts of science at the present time? He says:—

> We have the five following phenomena to assist us in investigating the cause of the primitive motions of the planetary system: (1.) The motions of the planets in the same direction, and very nearly in the same plane; (2.) The motions of the satellites in the same direction as the motions of the planets; (3.) The motions of rotation of these different bodies, and also of the sun in the same direction as the motion of projection, and in planes very little inclined to each other; (4.) The small eccentricity of the orbits of the planets and satellites; (5.) Finally, the *great eccentricity* of the orbits of the comets, their *inclinations* being at the same time entirely *indeterminate.*

Among all the different phases in which this theory is presented by modern scientists, we have been unable to discover a single instance in which the last phenomenon mentioned above has come under consideration. The nearest approach to a recognition of the important bearing of the cometary system on the nebular hypothesis is made by Le Conte in an article on this subject in the "Popular Science Monthly." He observes: "That they (the first four phenomena) are not consequences of the law of gravitation, is evident from the fact that comets *transgress* every one of these laws which could be applied to them."

The Cometary System.—In view of the important relation of cometary orbits to the nebular hypothesis, as set forth by its illustrious author, it is certainly remarkable that the author of the "Modern Genesis" should use the following language: "One other class of objects demands our attention. The comets revolve around the sun, and must be recognized as erratic members of the cosmical system, and our inquiry is incomplete if it do not ask, How did they originate? How were they cast off from the cosmical sphere?" To these questions the nebular hypothesis replies: "The comets *do not* belong to the solar system," neither were they derived from it, but are foreigners, wandering through space from sun to sun, and occasionally becoming fellow-citizens of the solar family.

After "a somewhat careful study of the subject for thirty

years," Mr. Slaughter should not have chosen the phenomenon regarded by Laplace as the chief support of his hypothesis, as one of his grounds of objection to that hypothesis.

In view of the importance of this point, and the fact that it is generally overlooked by writers on this subject, let us try to understand the bearing of cometary motions on the nebular hypothesis. We shall seek the interpretation of Laplace himself. He remarks:—

> Another phenomenon of the solar system equally remarkable is the small eccentricities of the orbits of the planets and satellites, while those of the comets are *very large;* and we find that the mean inclination of the orbits of all the observed comets approach near 90 degrees. The orbits of this system present no *intermediate shades* between great and small eccentricities. *Chance* alone could not have given a form nearly circular to the orbits of all the planets.

The great work of Laplace had been to reduce all the phenomena of the heavens to the single principle of gravitation. He is now trying to account for the genesis of the solar system by the operation of the "primordial laws of nature." As a natural philosopher dealing with second causes only, he felt bound to admit no other consideration. The comets, having been drawn in by solar influence, appear from all points of space, and with every degree of velocity, giving rise to the greatest diversity in their orbits. But, on the contrary, the planets have *uniformities* in their orbital motions inconsistent with the hypothesis of chance. Newton had proved that the law of gravitation allows bodies to move in orbits of every degree of eccentricity, from a circle to a hyperbola. Laplace had demonstrated "that the planetary ellipses always have been, and always will be, nearly circular; from whence it follows that no planet has ever been a comet—at least, *if we only take into account the mutual action of the bodies of the planetary system.*" He holds that the same cause which rendered the planetary orbits nearly circular must also have influenced the great eccentricities of the orbits of the comets and their motion in every direction, which would be the case if the bodies had been "projected at *random.*"

In order that effects so diverse might be attributed to the same cause, Laplace considered the conditions of its operation very dissimilar. The comets, having been projected at random

from the spaces beyond, possess great *diversities* in their elements. Since the planets possess "marvelous uniformities" in their elements, they must have been evolved from a revolving nebula. Since the orbits of the planetary and cometary system present no "intermediate shades between great and small eccentricities," he was prevented from adopting an hypothesis applicable to both classes of bodies. He concedes the possibility of cometary orbits becoming planetary orbits under influences *other than* "the mutual action of the bodies of the system." A resisting medium might change a "parabolic or hyperbolic cometary orbit into an ellipse." The same cause would eventually change an elongated ellipse into one of small eccentricity. If it can be shown that later discoveries have filled up the "intermediate shades" of planetary and cometary orbits, wanting in the time of Laplace, the hypothesis will be deprived of its chief support; for in the system of Laplace the hypothesis rests not so much on the "*marvelous uniformities*" observed by later theorists, as on the *dis*-uniformities of the solar system. Within a few years this gap between the *circular orbits* of the planets and *very eccentric* orbits of the comets has been filled up by the discovery of 159 planets and planetoids, besides many comets.

The following table will present to the eye the gradation by which planetary orbits pass into cometary orbits, thus proving that the genesis of all the bodies of the system should have a *single hypothesis.* We give the average of the elements of the planets, asteroids, and comets, placing the planetoid of greatest eccentricity next to the comet of smallest eccentricity:—

	Eccentricity.	Inclination. Degrees.	Direction of Motion.
The average for seven primary planets	0.0602	1¾	direct.
The eccentricity and inclination of 21 of the earliest asteroids (average)	0.1637	8¾	direct.
The eccentricity and inclination of Mercury	0.2056	7	direct.
" " of Polyhymnia	0.3397	..	direct.
" " of Aethra	0.3819	..	direct.
" " of second comet, 1867	0.5075	..	direct.
" " and inclination of Fay's comet	0.5560	11½	direct.
The average of twelve comets, whose aphelia are nearly equal to Jupiter's mean distance	0.7446	11¼	direct.
The average of the comets whose orbits extend to orbit of Saturn	0.7567	..	direct.
Those whose perehelia extend to the orbit of the planet Uranus	0.9005	..	direct.
The average of six comets whose orbits extend to the orbit of Neptune	0.9508	49	one retrograde.

Of twenty-one comets, whose mean distance exceeds the limits of the solar system, the eccentricity approaches unity, and their orbits are very eccentric. With this shading off of the characteristics of planetary orbits into those of the comets, it is impossible to say which orbits belong to the planetary system, and which to the cometary; which bodies were evolved from a central nebula, and which were drawn in from the celestial spaces.

Are the phenomena which are made the basis of the nebular hypothesis explicable according to the "theory of accretion," which seems to be the only alternative *physical* theory of the genesis of the solar system? We apply Laplace's hypothesis of the cometary system to the motions of *all the bodies* of the solar system, not because it is specially superior to his hypothesis to account for the motions of the planetary system, or is more in harmony with the teachings of natural theology, but in order to show how far we are, after all, from a correct theory of the universe. Directing our attention to the cause which Laplace admits is sufficient to transform a parabolic or hyperbolic orbit into an ellipse, we shall indicate the effect of this cause on the motions of all celestial bodies. Poisson, in his Mechanics, demonstrates the effect produced on the orbit of a celestial body, by a "resistance supposed, as in the motion of projectiles in the air, to be proportional to the square of the velocity." In addition to diminishing the mean distance, and accelerating the velocity, it is apparent from his formula that the effect of the resisting medium is much greater in aphelion when the motion is slower, than it is in perihelion. Consequently the aphelion distanced iminishes more rapidly, and the orbit becomes less eccentric. For instance the comet of 1843, whose aphelion distance is 112 times the mean distance of the earth, has a motion 400,000,000 times greater in perihelion than in aphelion. This position agrees with a conclusion, in *Mécanique Céleste*, in the case of orbits of small eccentricity. "Therefore, at the same time that the planet approaches toward the sun by the effect of the resistance of the medium, the *orbit will become more circular.*"

The problem by which the stability of the solar system is established seems clearly to indicate that one of the indispensable conditions of stable equilibrium, is that all the bodies

shall revolve in the *same direction.* If a body should come into the system in the opposite direction from the prevailing motions, the perturbations would eventually bring it into collision with some heavier body, by which it would be absorbed and borne along in the common direction. This, perhaps, accounts for the fact that so few of the known elliptical comets have a retrograde motion. The planet Jupiter exerts a controlling influence in the solar system, especially over the inclinations of the orbits of all other bodies. His action has a tendency to bring all other orbits to coincide with his own. The influence of Jupiter, and the major planets generally, over the cometary orbits, is seen in the fact that the aphelion of the comets whose orbits are included within the limits of the solar system very nearly coincide with the orbits of the larger planets. There are twelve comets whose mean aphelion distance is 5.6, the mean distance of Jupiter being 5.2, and his aphelion being 5.5 times the mean distance of the earth from the sun. There are two comets and a meteor ring whose mean aphelion distance is 19.62, the mean distance of Uranus being 19.18. There are six comets whose mean aphelion is 34.03, the mean distance of Neptune being 29.77. These coincidences clearly prove a physical connection between the planets and comets. With this position agrees the observation of Laplace: "The attraction of the planets ought to change several cometary orbits into ellipses."

It may also be shown that the rotary motion of the planets, in consequence of a resisting medium, should be in the direction of the orbital motion, and in a plane nearly coincident with that of the orbit. The solar attraction on a body, with free vapors or liquids on its surface, converts it into an ellipsoidal figure with the longer axis directed to the sun. But in consequence of the greater attraction on the particles nearest the sun, the bulge will be slightly greater within the orbit than on the opposite side of the body. The center of gravity through which the axis passes will be farther from the particles on the side toward the sun than from those on the opposite side. Consequently the resistance will be greater at that point, causing it to move in a direction opposite to that of the motion of projection, and the whole body to rotate in the direction of the orbital motion, which is the case of the planets and satellites.

It may be objected, that the luminiferous ether, notwithstanding its supposed effect on the motion of Encke's comet, is too hypothetical to be made the basis of a bolder hypothesis. Admitting this to be so, observation has demonstrated the existence of an abundance of cosmical matter distributed throughout space, which must present a real resistance to all bodies moving against it. This matter becomes manifest as it is encountered by the earth, in its motion through space, in shooting stars, fire-balls, and aerolites. This matter is not uniformly diffused, but seems to cluster about certain points, or fall into rings, which, in some cases, have a close connection with cometary orbits. These shooting stars may be the remains of cometary disintegration resulting from the powerful action of the sun on the comets, in their perihelion passage. Seven principal streams of meteors have been detected and very well located, through which the earth passes at certain seasons of the year. Besides these, Schiaparelli, and others, have located the "radients," or points of emanation, of more than fifty sparsely strewn meteor-systems encountered by the earth in its annual revolution. No doubt the comets and all other bodies meet with cosmical matter, which is "diffused profusely throughout the universe," according to the observation of Laplace. In the course of ages this diffused matter must present a sensible resistance to the motion of bodies through the universe.

Professor Newton, of Yale College, estimates the number of shooting stars encountered by the earth during each year at about 400,000,000. Calculations based on their apparent magnitude, as viewed from different points of the earth's surface, give them a diameter ranging from 80 to 120 feet. Supposing their density to be the same as hydrogen, the lightest known substance, the earth during the past 100,000,000 years has encountered and absorbed into itself a mass of matter equal to $\frac{1}{11\,1\,11}$ of its own mass. Such an amount of resistance would be sufficient to change the earth's orbit from an extreme oval into its present shape.

This is essentially the "theory of accretion," advocated by Proctor and some other astronomers. We have seen no attempt to bring this theory into harmony with the phenomena of the solar system. Mr. Proctor attempts to account for the

distribution of planetary masses on this hypothesis. The nebular hypothesis has never succeeded in its attempt to account for the anomalous collocation of the planets. According to the view of Proctor: "The solar system had its origin in the gathering together of matter toward a great center of aggregation. The nebulous masses would be thrown into the great center. There would be one center of aggregation. That center would grow continually in size and power—gradually drawing in more and more matter to it. How, then, does the secondary aggregation take its origin? I suppose that would arise not in one direction only, but some in one, some in another, with a superabundance in one direction; great subordinate masses would be formed, perhaps, not continuing separate for any length of time."

The Satellites and "Kirkwood's Analogies."—"One of the most remarkable phenomena of the Solar System," observes Laplace, "is the rigorous equality which is observed to subsist between the angular *motions of rotation* and *revolution* of each satellite. It is infinity to unity that this is not the effect of hazard." He attempts to account for this phenomenon in the case of the moon on the assumption that, being originally in a state of vapor, it would assume the form of an elongated spheroid. The terrestrial attraction ought at length, by making the two motions of the satellite to approach each other, to cause their difference to fall within the limits at which their rigorous equality commences to establish itself." According to the modern theory of energy, the same result is secured by the action of free fluids on the surface of a *solid* body. It is maintained that tidal friction will eventually bring the rotary motion of the earth into an equality with its annual motion.

The motions of the first three satellites of Jupiter present a phenomenon still more extraordinary than the preceding, one which consists in this, that the mean longitude of the first, minus three times that of the second, plus twice that of the third, is constantly equal to two right angles. Laplace claims that these motions were brought within certain limits, when the mutual attraction of the three satellites was sufficient to "render this relation accurately true," by the resistance presented by "the less condensible molecules" remaining around the

primary immediately after their formation. If this is the true cause of such a remarkable relation, the resistance presented by an etherial medium, or cosmical matter, will account for it equally well. Mr. Kirkwood, of Indiana, has recently discovered the same relation between certain asteroids, thus showing that the cause is more general than that given by Laplace.

In the year 1850 Mr. Kirkwood, whom Proctor calls the "modern Kepler," discovered a certain relation between the rotary and orbital motions of the planets, which was hailed as a powerful support of a waning hypothesis. This relation is called 'Kirkwood's Analogy,' and is thus expressed: The square of the number of rotations made during one revolution, divided by the cube of the diameter of the sphere of equal attraction, is a *constant* quantity for all the members of the solar system. When the discovery was communicated to the Academy of Science it was discussed *pro* and *con*. Prof. Walker remarked: "We may, therefore, conclude that, whether 'Kirkwood's Analogy' is or is not the expression of a physical law, it is at least that of a physical fact in the mechanism of the universe." If we accept either the theory of a luminiferous ether or tidal friction, or both, this relation cannot be permanent, since the orbital and rotary motion, supposed to be related by this analogy, are affected by forces which are wholly independent of each other. While a resisting medium accelerates orbital motion, tidal friction retards rotary motion. But the failure of the analogy in its application to the satellites is fatal to it, as a general principle. Prof. Walker remarked: "In the secondary systems the day and month are the same. This fact has remained hitherto unexplained." "In this case we may conclude that the rotary motion had exceeded the orbital motion immediately after the breaking of the ring, and only arrived at a state of equality by the loss of *caloric* from radiation." Contraction, consequent on radiation, has a tendency to *accelerate* rotation instead of retarding it. The development of the theory of energy since the discovery of the analogy entirely changes the bearing of this subject on the nebular hypothesis.

The Spectra of the Nebulæ.—After the resolution of many of the nebulæ by Lord Ross's great telescope, it was assumed, in opposition to Herschell's speculations, that all nebulæ might

be resolved by increased telescopic power. But the spectroscope, supplementing the work of the telescope, has revealed the fact that of the sixty nebulæ, whose light is sufficient to give reliability to the results of examination, twenty are found to be in a gaseous condition. Thus, what was lost to the nebular hypothesis by the telescope of Lord Ross, was supposed to be regained by the spectroscope of Huggens. These nebulæ may be divided into two classes. "All planetary nebulæ," says Huggens, "yield the same spectrum, the bright lines appearing with considerable intensity." The ordinary nebulæ give spectra of two or three bright lines, indicating the existence of masses of luminous gas, of which hydrogen and nitrogen are the chief constituents. If we compare these spectra with those of the gases hydrogen and nitrogen, we shall be able to arrive at some knowledge of their *density*. We have from two to four spectra of each of these gases, according to the degree of density. At a pressure of one-six-hundredth of an atmosphere, we have the three characteristic bright lines of hydrogen, deep-red, greenish-blue, and blue-violet. At the *minimum* pressure there are lines in the green alone. Up to a pressure of about one fourth of an atmosphere the spectrum of hydrogen attains its full brilliancy; but as the pressure increases to about one half of an atmosphere, it gradually loses in intensity without its general character being essentially changed, excepting that its individual lines, as was observed by Plucker, "*begin to widen.*" With a higher pressure the spectrum becomes continuous, and cannot be distinguished from that of star clusters. "Irresolvable nebulæ of high pressure cannot be distinguished by the spectroscope."

With these observations agrees the *theory* of spectrum analysis founded on the vibratory theory of light, as presented by Prof. Tait. "From free particles we get in general a few definite forms of vibration, corresponding each to a fine line in the spectrum, except in so far as this is modified by the relative velocities of the particles with regard to one another. When there are collisions, but not very numerous, we get slight modifications. So these lines broaden out on both sides. The effect of increased pressure and temperature is to make all the bands of the spectrum broader and broader; and finally, when we compress sufficiently to reduce the gas to what is

perceptibly a solid, or at all events an incandescent liquid, the bands have so spread out that they meet one another, and you have got, in fact, a practically continuous spectrum."

Hence we see that the spectroscope is capable of telling us still more regarding the nature of the light analyzed by it, than the nebulous condition of the matter from which it emanates. It is just here that the evidence it gives is unfavorable to the hypothesis of Laplace. The density of a gas produces an effect upon the spectrum, and is measured by the *breadth of the lines* composing it. Now the nebular hypothesis requires, as a necessary corollary—and it has accordingly always been admitted as such—that nebulæ of every degree of condensation should be found in the heavens, and the *variation* of the *brilliancy* of these bodies has therefore been pointed to as evidence of variation of density. The width of spectral lines, however, provides us with much more certain, reliable, and delicate test.

Mr. Plummer, in an article in the "Natural Science Review," says: "From the observations of Huggens, it would appear that the bright lines in the nebular spectra present no appreciable thickness in all those cases in which it has been possible to use a very narrow slit. The lines have invariably been found to be exceedingly fine, and hence we are furnished with distinct proof that the gases so examined are not only of *nearly equal* density, but that they exist in a very low state of tension. *This fact is fatal to the nebular theory.*" In the spectra of the nebulæ we have only a double line of nitrogen and the second line of hydrogen. The question why the characteristic bright lines of terrestrial hydrogen and nitrogen are not visible in the spectra of nebulæ has long occupied the attention of Huggens. Schellen remarks: "The only reliable conclusions reached by these spectroscopic investigations are: the temperature of the nebulæ is *lower* than that of the *sun*, and that their density is *remarkably small*, being in a highly rarefied condition."

These nebulæ, instead of lying beyond the stellar system, may even belong to the solar system, and be in some way connected with the comets. Assuming their distance to be half that of the nearest fixed star, and that they are moving at right angles to the line of vision, it would require about 250 years

to pass over one second of an arc, and their parallax would be less than two seconds. Such a motion could not be detected since the time these bodies were catalogued. This view seems very probable, especially in the case of extensive nebulæ, since the enormous magnitude which must be attributed to such a mass as the great nebula, Orion, is unfavorable to the assumption of an extra stellar position.

But a still more fatal objection to the assumption that nebulæ are the first stages of system-development would appear to be, that the gases which have been identified in the nebulæ do not seem to be, in themselves, adequate to form a system such as our own, unless by the addition of foreign matter. The addition of cometary matter would not give rise to the complex condition of the terrestrial elements, since the spectra of comets reveal little else than carbon.

All things considered, it may be doubted whether the nebular hypothesis has made any substantial advancement since it was set forth by Laplace, as a mere "conjecture," three quarters of a century ago. In view of this fact, it is remarkable that Dr. Winchell should make the following comparison, equaled only by that recently made by Professor Huxley. The former observes: "We said this account of planetary genesis (nebular hypothesis) was but an hypothesis. So was the doctrine of universal gravitation a hundred years ago. The latter says: "And the doctrine of evolution at the present time rests upon *exactly as secure* a foundation as the Copernican theory of the motions of the heavenly bodies."

Nearly two centuries ago the "*Principia*" appeared, in which its immortal author establishes the truth of the law of gravitation on the firm basis of induction and deduction. More than a hundred years have passed away since this theory was found to be in perfect accord with *all* the phenomena of celestial motions. The accuracy with which predictions are made relative to celestial motions, is a standing demonstration of the correctness of the theory of Newton. Newton was led to the general fact by a series of inductions, and from this principle he descended again to explain the heavenly motions. "This great man," says Laplace, "would justly have merited the reproach of re-establishing the occult qualities, if he had

been content to ascribe to universal attraction the celestial and terrestrial phenomena, without demonstrating the *connection* of his principle with these phenomena. This analytical connection of particular with general facts is what constitutes a theory," as distinguished from a mere hypothesis.

The nebular hypothesis rests on neither induction nor deduction, but has been evolved from the cloudy imagination of the theorist, and is about as attenuated as the original world-stuff. Professor Winchell placed before the gaze of Mr. Slaughter his "stupendous object lesson, which, like *curdled firemist*, engirts the sun." The pupil exclaims, "Curdled firemist that engirts the sun! Curdled nonsense. It is little less than charlatan dogmatism introduced into the domain of science." We should feel like sharing in this indignant outburst were it not that we have great respect for the memory of Herschell, who was the first to employ the word "Curdled" in this connection. It is certainly a remarkable phenomenon that a mere speculation, a "conjecture" of a great mathematician, should, in later times, be accepted as a scientific verity, without having passed the ordeal of every hypothesis before it is entitled to be installed as a true theory Science should either support the nebular hypothesis by a greater array of facts and arguments, or else remand it to the category of mere plausible conjectures, which have outlived their day. This opposition to "science, falsely so called," on the part of the theologian, may possibly be pardonable in view of the following opinion entertained by Dr. Winchell concerning those who are not entitled to speak by "authority" on this subject: "Occasionally we hear a dissenting voice, but it proceeds almost always from persons who, whatever their eminence in theology or letters, have little authority in matters of scientific opinion."

The Hypothetical Nebula in its relation to Molecular Science and Geology.—It is assumed in this hypothesis that the matter of the system existed originally at such a temperature as to be in a condition of vapor of great tenuity stretching across limits wider than the orbit of the remotest planet. This assumption seems utterly at variance with some well ascertained facts of "molecular science." The fundamental principle of this science, deduced from the observed laws of gases, is also found to be in harmony with the general phenomena of matter in its gaseous state.

The application of this principle in accordance with mechanical laws has led to some remarkable results. Under standard conditions of pressure and temperature at the earth's surface, the molecules of hydrogen have a motion among themselves of an average velocity of about 6,000 feet per second. Oxygen has a motion of 1,800 feet per second. The molecules of air vibrate at the rate of 1,400 feet per second.

Professor Cook observes: "That molecules of a body like the planets are in constant motion. In a gas this motion is supposed to take place in straight lines, the molecules hurrying to and fro encountering each other. The molecules, or atoms, if unconfined, would move off indefinitely into space." We can easily calculate the *density* of a nebula consisting of the matter of the solar system, and filling the orbit of Neptune. "It would require several cubic miles of such matter to weigh a single grain." We can also determine the *pressure* exerted by gravity at the surface of such a nebula. Having the pressure and density referred to the standard of hydrogen, we can ascertain, by the formula of Maxwell, the motion of hydrogen particles. At the temperature of freezing, this motion of the hydrogen atoms is about 9,000 feet per second. We can also calculate the velocity with which a body or particle must be projected from the surface of the nebula so as to pass off into space, beyond the control of gravity. A projection causing a velocity of about one tenth of a mile per second would forever separate a particle from the mass. Hence we see that not only hydrogen, but the heavier molecules, would be dissipated into space, and the continuity of the mass would be impossible.

On the assumption of the original nebular condition of the matter of the solar system, Sir William Thompson has demonstrated by a threefold argument that about ten millions of years is the limit that can be allowed from a physical point of view for all the changes that have taken place on the earth's surface, since vegetable life of the lowest known form was capable of existing thereon. His argument is based on the internal heat of the earth as showing the time of *consolidation*, on the tidal retardation of the earth's rotation, in its relation to the time when the earth solidified, as indicated by the amount of oblateness, and on the time, which the sun's temperature could supply the earth with heat. The gravitation the-

ory of the sun's heat, as held by Helmholtz, gives about twenty millions of years for the original nebula to condense to the dimensions of the sun. Mr. Crall, after making the most favorable assumption possible relative to the specific heat of the nebula produced by the coming together of two equal masses, having a large velocity of projection, from the stellar spaces, can only give us seventy millions of years. But both he and Thompson, as if to accommodate their geological friends, substantially agree that: "The general conclusion to which we are led, from *physical* considerations, regarding the age of the sun's heat, is, that the entire geological history of our globe must be compassed within less than one hundred millions of years." The problem is still further complicated by the experiments of Bischoff upon cooling basalt. He shows "that for our globe to cool down from 2,000 degrees to 200 degrees centigrade, would require three hundred and fifty millions of years.

But there are geological phenomena, material and vital, which point to a much longer period than that given by Thompson and Crall. The amount of denudation and stratification, as well as the slow modifications, of animal types, require, according to the geologist and palæontologist, from fifty millions to five hundred millions of years. Darwin demands three hundred millions. Lyall was content if he could have two hundred and forty millions. Huxley seems to point to the round number of a thousand millions of years in which to arise from protoplasm to man. Here is a clear conflict between the naturalist and philosopher. Either the geologist must be compelled to surrender some hundreds of millions of time, or the physicist must give up the nebular theory as the foundation of the condensation hypothesis of the sun's heat and the earth's present temperature. The geologist will probably carry the day, and the nebular hypothesis will have to give way to some other speculation relative to the origin of the solar system.

The Origin of Rotary Motion.—Laplace in his speculations assumes the existence of the rotary motion of the nebula as an unexplained fact. Helmholtz remarks, that there was "a motion of rotation originally slow, the existence of which must be *assumed*." The more modern speculators endeavor to account

for this motion on the principle of gravitative force. Spencer holds that the irregular "flocculi," or flakes of condensed matter, moving in a rarer medium, and passing to one side of the center of gravity on account of their irregular shape, impart a rotary motion to the mass. Why they have a tendency to pass on one side of the center of gravity rather than on the other, we are not told. Mr. Slaughter holds that this theory violates the law of motion, "that action and reaction are equal."

Winchell, in his "Sketches of Creation," has presented his view of this subject as follows: "The attractive influences of Sirius, Capella, Vega, and all the other fixed stars, were felt. The cosmical vapor which might otherwise have been perfectly spherical became *distorted* in its form. The position of the center of gravity was changed." If Mr. Slaughter, in his "Modern Genesis," had acquainted himself with the views of the author of the "Geology of the Stars," he could not have fallen into the error of using the following language: "There is no force contemplated as acting on the cosmical mass *from beyond* itself to give it rotary motion. But the contraction would be in the direction of the center."

Le Conte rejects Winchell's theory, and advances one of his own liable to precisely the same objections. He holds that "the nebular mass is formed of discrete masses which, by their collision, engender rotary motion." On the contrary, the collision of the last one of the "discrete" bodies of our isolated system would produce complete equilibrium. We can reply to Le Conte in the language which he uses to demolish the condensation theory. "How can we," says he, "reconcile a generation of rotation in the whole mass, in consequence of cooling and condensation, with the fundamental principles of the equality of action and reaction?" His own theory violates this law.

Let us examine Winchell's theory more at length. In reply to a note of the writer setting forth the atheistical tendencies of his position, he says: "I state that without the exertion of force *ab extra* no rotation would ensue." The effect of the attraction of the stars on the nebula would be to convert it into an ellipsoid, with its longest axis in the direction of the most powerful influence. While it is true that the particles in the course

of condensation will not move toward the center of gravity, but on a line normal to the surface, there is no reason why the particles similarly situated should not press equally on opposite sides of the axes, and thus produce equilibrium. The effect of the attraction on the shape of the nebula was similar to that exerted on the moon. Laplace observes: "We may conceive that the moon in a state of *vapor* assumed, in consequence of the powerful attraction of the earth, the form of an elongated spheroid, of which the greater axis would be constantly directed toward the earth."

Granting, however, that motion may be initiated about the shortest axis on account of prevailing impulses in some one direction, still the effect of tidal friction would be to instantly *check* this motion. These *ab extra* bodies which distort or bulge the nebula in the direction of the most powerful attraction, would not be less effectual in creating a tide in case the nebula began to revolve. Such an effect seems to be recognized by Laplace in his reasoning on the cause of the libration of the moon. "The terrestrial attraction acting while the moon is in a state of fluidity ought to make the two motions of the satellite to approach each other." That is, the external force which distorts the body has power to retard or check its rotary motion. The tidal wave must have acted just as surely on the original nebula "as a brake," as it once did in arresting the rotation of the moon, or as it does now on the earth. According to the views of Winchell we have the same cause, the action of exterior bodies, virtually giving rise to motion at one stage of the development of matter and destroying it at another stage. Such diverse effects should not be attributed to the same cause.

From the above considerations it is extremely doubtful, in the first place, whether an attenuated nebular mass filling the orbit of Neptune could exist in harmony with the conclusions of molecular science. In the second place it is equally doubtful whether gravitative force could initiate rotary motion without violating one of the plainest principles of philosophy. Finally, if such a rotation were commenced, tidal friction would doubtless at once destroy it.

Ring Formations and Equilibrium of Revolving Spheroids.—In our further investigations of this subject we shall have special

reference to "The Modern Genesis," by Rev. W. B. Slaughter, a work to which reference has already been made. This book is an attempted refutation of the nebular hypothesis, chiefly on the ground that the phenomena of the solar system are not in harmony with the mechanical principles on which the hypothesis is based. The avowed purpose of the author is "to examine the nebular theory in its *present phases.*" The phase, however, presented by Dr. Winchell in one of the "Half-hour Recreations of Popular Science," entitled "The Geology of the Stars," is the one which claims the chief attention of Mr. Slaughter. As Mr. Winchell, and other nebular theorists, accept both the principles and conclusions of Laplace, presenting few "new phases" of this subject, we shall examine the "Modern Genesis" in the light of celestial mechanics and the nebular hypothesis.

There is not wanting evidence that Mr. Slaughter not only failed to grasp some of the most important principles of natural philosophy lying at the foundation of this subject, but that he neglected to study the nebular hypothesis as sketched by the master-hand of its author. He observes that "the peripheral ring was detached by the centrifugal force, but *how* the ring was changed into a planetary mass the advocates of the theory do not try to show." On the contrary, Laplace gives the entire *modus operandi* of this change. He remarks: "Almost always each ring of vapor ought to be divided into several masses—Saturn's rings being an exception. If one of them was sufficiently powerful to unite successively by its attractions all the others about its center, the ring of vapors would be changed into one sole spheroidal mass."

On the question of revolving spheroids Mr. Slaughter remarks: "But the *equation* of the gravitation and centrifugal forces will always be such that there cannot be such a thing as the casting off any portion of the mass."

In the absence of definite information given by Mr. Slaughter as to this important equation, let us present some of the most important results reached by profound mathematical analysis. In celestial mechanics it is demonstrated that the shortest period of rotation of a homogeneous fluid in *equilibrio* of the same density as the earth is 0.1009 of a day, or about one tenth, and this limit varies reciprocally as the square root of the density.

When the motion of rotation increases in rapidity, the fluid mass becoming more flattened at the poles, its period of rotation becomes less, and ultimately falls within the limits of equilibrium. This paradox is easily understood if we bear in mind that a particle at any degree of latitude has less rotary motion than a particle on the equator. As it reaches the equator it will act as a brake on the rotation. "After a great many oscillations, the fluid, (or gas,) in consequence of the friction and resistances which it experiences, fixes itself in a state of equilibrium."

It is extremely doubtful if the rotary motion, as the result of secular cooling and contraction, could ever exceed these limits of equilibrium. Is the formation of a ring possible at this limit? It has been proved that in the spheroid of equilibrium the equatorial diameter is about two and seven tenths (2.7197) times the polar diameter. It might be supposed that this limit is that in which the fluid would begin to fly off because of its too rapid rotary motion. Such is not the case, since this "could only happen when the whole action at the equator is nothing, or when the centrifugal force becomes equal to the attraction of the spheroid. In the case of the limit of equilibrium, the gravity at the equator is still about one half that of the pole." The advocate of the nebular theory ought to prove that the tendency to acceleration of the motion resulting from cooling and consequent contraction, is greater than the tendency to retardation resulting from friction among the molecules while the mass is in a state of unstable equilibrium.

Actual Velocities.—In discussing the subject of actual velocities Mr. Slaughter makes two assumptions, neither of which is accepted by the advocates of the nebular hypothesis. The first one is, "The periodic times may be said to be the same from age to age." From this assumption he makes the inference, that "we are justified in the declaration that the present orbital period of each planet must indicate what the original period of the cosmical mass was at the time the planetary mass was detached." This assumption is invalidated by the hypothesis of a resisting medium which presses the planets and comets toward the sun, and consequently accelerates their motions "from age to age."

A single outburst of Dr. Winchell's "enthusiasm" in his "Sketches" should have been sufficient to set his reviewer right on this question. Mr. Slaughter thus describes this enthusiasm: "Nothing can exceed the enthusiasm of Winchell, unless it be the inconceivably high temperature of the original world-stuff. Nothing can compare with the grandeur of his periods, unless it be the original grand rotation itself." This glowing rhetoric is illustrated by the following passages from the "Sketches of Creation:" "Hark! from the highways of the comets come tidings of *friction* in the machinery of the heavens. The filmy wanderer encounters *resistance* in his long journey to the confines of the solar system. He plows his way through a resisting medium. He falls toward the sun and his orbit is diminished. Not only are the cloud-like comets slowly approaching the sun in spiral curves, *but every revolving planet.*" It is passing strange that Mr. Slaughter never heard this "music of the spheres," which breaks on the ear of scientific speculation. While, however, his philosophy is bad, the conclusion to be drawn is not invalidated, since the motions of the planets were slower at their origin than they are now.

He applies his *dictum* to the motions of Neptune and Mercury in order to show that nebulæ filling their respective orbits would be but slightly spheroidal on account of a rotary motion, corresponding with the present orbital motions of those bodies reaching "the conclusion that the ascertained rate of the supposed cosmical rotation is totally inadequate to produce a very *considerable oblateness* of the cosmical sphere." In coming to this conclusion why did not Mr. Slaughter give us the result of the rotation of a mass, not of the density of water, but of the actual density of the matter of the solar system, filling the planetary orbits? And why, in the second place, did he compare this homogeneous nebula with the solid mass of the earth, which is not homogeneous, instead of giving the oblateness produced, on the supposition of homogeneity? As the case stands, his conclusion is little better than a rough guess.

He asks a question in connection with Neptune which he should have answered himself for his readers: "Will you show us that a rotation at the rate of one eleventh of a second per hour is sufficient to produce even a great degree of oblateness in such a body as the original cosmical mass is supposed to

have been?" We can answer this question definitely by the application of the rule given by Laplace, as found on pages 146 and 147 of this Review. We can readily ascertain the time of revolution beyond which equilibrium ceases to be possible. Having computed the density of the nebula filling the orbit of Neptune, we are furnished with the time of revolution, which is about 274 years in the case of Neptune, producing an oblateness such that the equatorial diameter will be about two and seven tenths times the polar axis. But Neptune revolves in his orbit in 164 years. Hence the oblateness will be further increased unless checked by the friction of the molecules, as previously observed. To a similar question, whether Mercury, under the same conditions as those of Neptune, "would exhibit any perceptible oblateness?" we reply: Should the mass revolve in 112 days, it would assume the shape of a spheroid of equilibrium whose equatorial diameter would be two and seven tenths times the polar diameter. But since the period of Mercury is 88 days, the oblateness will be still greater.

The Relation of Orbital and Rotary Motion.—Mr. Slaughter asks the question, "What must be the ratio of the axial to the orbital rotation of any given planet?" As the rotary motion of a planet results from the *difference* of the motions of the *outer* and *inner* particles of the ring, after its fragments have coalesced, we should expect the outer planet to have the slowest rotation, while the motions of the other planets would regularly increase as we approach the sun. Such, however, is not the case. The conclusion resting on the fact that there is no ratio between the two planetary motions, depends on the assumption of the "*invariability* of rotary motion." Our remarks on "Kirkwood's Analogy" will apply to this branch of the subject. Mr. Slaughter has not seen fit to call the attention of his readers to the bearing of this "analogy" on this subject. There are two causes affecting the length of the day of all the planets possessing free particles. Condensation accelerates rotary motion; tidal friction retards it. The latter cause is most effectual in checking the motions of the planets nearest the sun, and least effectual on the motions of massive planets.

It may be said that we have laid entirely too much stress

on the theory of "dissipation of energy" as illustrated by tidal friction and resisting medium. Laplace seems to have recognized the influence of molecules among themselves in modifying motions of small intensity. "The fluids which cover this planet have destroyed by their friction and resistance the primitive oscillations of its axis of rotation." Helmholtz observes: "The motion of the tides produces friction; all friction destroys *vis viva*, or living force. We, therefore, come to the unavoidable conclusion that every tide, although with infinite slowness, still with certainty, diminishes the store of mechanical force of the system; and as a consequence of this the rotation of the planets, having fluids on their surface, round their axis must become more slow." Sir William Thompson and Prof. Tait have elaborated this theory more fully than any other philosophers. They say: "Whatever may be the relative importance of tidal friction and of the resisting medium, there can be but one ultimate result for such a system as that of the sun and planets. That result is the falling together of all into one mass, which, although rotating for a time, must in the end come to rest relatively to the surrounding medium. The tendency of retardation is not counterbalanced to more than a slight degree by the tendency to acceleration which results from secular cooling. Allowing for the retardation of the moon's mean motion by tidal friction or reaction, Adams estimates twenty-two seconds as the amount of error by which a perfect clock would get ahead of the earth in a century." It is claimed that there is an error in Laplace's theory of the earth's constancy of rotation, resulting from an inaccuracy in the amount of the moon's secular variation, which later mathematicians have corrected.

In the "geology of the stars," under examination by Mr. Slaughter, the influence of tidal friction in "destroying the *vis viva* and making the rotation continually slower," is distinctly set forth. Why Mr. Slaughter entirely ignores this principle in his discussions we are unable to understand. It would not be proper to hold that he was ignorant of the bearing of this theory on the questions discussed "after a careful study of the subject for more than thirty years."

Assuming the solar system to be an isolated system, not subject to external influences, we can readily show, by the appli-

cation of the principle of the "conservation of areas," fully developed in Celestial Mechanics, that the nebular hypothesis is untenable. This principle is thus expressed: "If we suppose a system of bodies acting on each other in *any manner whatever*, the sum of the products of the mass of each body into the area which the projection of its *radius vector* traces is *proportional* to *the time*." That is, for the same duration at any two epochs, however widely separated, this quantity is *constant*. We can compute the value of this constant from the present masses and motions of the system. If all these masses are viewed as diffused throughout the system as the original hypothetical nebula, possessing the same constant amount of *vis viva*, we can calculate the rate of rotation of the masses successively filling the respective orbits at the time each planet was detached. The rotary motion will be such that the sum of the areas described in a given time by the particles projected upon the plane will be the same as at the present time. Applying the principle to the sun and Mercury, we find that the rotation of the combined mass would be accomplished in about 470 years, or 1800 times the present period of Mercury's revolution. If, therefore, Mercury was detached from the sun, the quantity of motion must have been about 1800 times greater then than it is now.

The Direction and Perturbations of Planetary Motions.—The direction of planetary motions is the next subject discussed by Mr. Slaughter. He starts out with the assertion, "that the projectile always moves in a direction at right angles with the axis of rotation;" hence "the planes of the planetary orbits and the plane of the cosmical equator must be *exactly coincident*. We *demand uniformity*." Neither nature nor the nebular theorist has seen fit to comply with this arbitrary demand. Laplace, anticipating the objections which might be urged on the ground of *dis*uniformities, gives the following explanation: "But we may suppose that the innumerable varieties which must necessarily exist in the temperature and density of different parts of these great masses ought to produce the *eccentricities* of their orbits and the deviations of their motions from the plane of this equator." In answer to Mr. Slaughter's question, "Will any one aver as a fact that stellar attraction affects the movements of a planet so as to change the plane of its orbit?"

Mr. Winchell would reply by pointing to Sirius, Capella, and Vega, "hanging on the verge of the firmament," exerting "their attractive influences on the solar system in its earliest infancy."

In reducing the planetary orbits to the plane of the solar equator, Mr. Slaughter has made an egregious blunder by *adding in all cases* the inclination of the sun's equator to the ecliptic to the inclinations of the planetary orbits, overlooking the important fact that the respective longitudes of the ascending nodes of the solar equator and planetary orbits must determine whether we shall *add* or *subtract* these quantities. If the ascending nodes of the solar equator and planetary orbit have the same longitude, the inclinations should be subtracted; if they are 180 degrees apart, they should be added. Applying this rule, we make the following very important corrections of Mr. Slaughter's numbers. As the ascending nodes of the solar equator and Mercury's orbit are nearly coincident, we subtract the inclination of the orbit, which is seven degrees, from the inclination of the sun's equator, which gives for the inclination of the two planes to each other one third of a degree instead of fourteen degrees. Approximately this rule gives for Venus four degrees instead of thirteen; for Mars five degrees instead of nine. Since the longitudes of the ascending nodes of the other planets approach to 180 degrees, the error is much smaller.

According to Laplace, the deviation of a planetary equator from the plane of its orbit, and of this plane from the solar equator, may be the result of the same causes. He observes: "If any comets have fallen on the planets, their fall has caused the *planes* of the orbits and of the *equators* to deviate from the plane of the solar equator. It is probable that such encounters have taken place in the immensity of ages which have elapsed since the commencement of the planetary system."

The author of the "Modern Genesis," in dealing with the subject of "direction of planetary motions," has entirely ignored the very important bearing of "planetary perturbations" on this question. Mr. Stockwell has conducted an elaborate and careful investigation, published in the "Smithsonian Contributions to Knowledge," in which he shows the limits of the variations of the planes of the planetary orbits, referred to

what is called, in Celestial Mechanics, "the invariable plane" of the solar system. These changes require vast periods of time to pass through a complete cycle. I have calculated the inclination of this plane and find it to be $6\frac{1}{12}$ degrees. It is an easy matter to refer the planes of the planetary orbits to the plane of the sun's equator, and then determine, from the variations given by Stockwell, how nearly these planes may coincide with the solar equator during the "secular variations" of the planetary elements. I have made this calculation with the following results: The orbit of Mercury may *coincide* with the sun's equator. At the nearest approach of the planes of the orbits to the solar equator the following numbers give the inclination in degrees: Venus $2\frac{5}{12}$, the Earth 3, Mars $\frac{1}{8}$, Jupiter $5\frac{3}{4}$, Saturn $5\frac{1}{12}$, Uranus 5, and Neptune $5\frac{3}{10}$ degrees.

In consequence of perturbations the retrograde motion of the moon's orbit may reduce the angle of its inclination to the earth's orbit from 29 degrees, the figures employed by Mr. Slaughter, to 18 degrees, as may be verified by comparing the moon's greatest declination during the present year with its minimum nine years ago, as given in the Nautical Almanac. The precession of the equinoxes of all the planets is also dependent on the same cause, and produces great variations of the angles made by the solar and planetary equators. The extent of variations resulting from this cause is about 12 degrees, or twice the inclination of the solar equator to the ecliptic. Hence, any valid objection to the nebular hypothesis based on the variation of the orbits or equators from the solar equator, must be subject to the above limitations. The conclusions of the "Modern Genesis" resting on such variable data are not very reliable. The *uniformities* of the ideal Jovian system, less subject to perturbing influences, in which the orbital planes of the satellites coincide with that of Jupiter's equator, should have admonished Mr. Slaughter of the weakness of his positions.

There are many other positions of the "Modern Genesis" open to attack on philosophical and astronomical grounds, but space will not allow of their examination. The chapter on "Relative Densities" is specially at fault, both as to principles and reasoning. As a presentation of superficial objections the work may have a place; but will fail to have much, if any, weight with scientific minds.

The Stable Equilibrium of the Solar System.—There are phenomena connected with the solar system inexplicable either by the nebular hypothesis or the "theory of accretion.' Granting that the "marvelous uniformities" may be reasonably accounted for by either of these views of planetary genesis, still there are certain "dispositions of matter in the planetary system," pointed out by Chalmers, or "an adjustment of bodies with their properties in respect to space" indicated by M'Cosh, which have never been traced to the action of the "primordial laws of nature," but which seem to have been "fixed at the original setting up of the machine" by a power transcending these laws. Newton explains these uniformities thus: "This admirable arrangement can only be the work of an intelligent and most powerful being." The writer of the article on "Nebularism," in "Appleton's Encyclopedia," admits that "It does not explain the *distribution* of the *masses* of the solar system." Proctor says: "A gradually contracting nebulous mass could scarcely, in my opinion, have produced a system in which the masses are at first view so irregularly scattered as in the solar system." Proctor's explanation of the fact is equally unsatisfactory.

If the perpetuity of the solar system was the object sought by the Author of nature, Laplace admits that such an end is admirably secured by its actual arrangement. That is no other system governed by existing laws, could more clearly manifest intelligence, as far as we know. In the solution of the problem of the stability of the solar system, the uniformities seem to be an indispensable condition of the reliability of the result. Even in the phenomenon of "precession," depending on the spheroidal form of the planets, there is some indication that rotary and orbital motion must be in the same direction in order to insure stability.

Assuming that the ultimate aim of the planetary system was to furnish a fit theater for the display of *vital* phenomena, we see the importance of its stability, and of those changes which result from perturbations and on which the vicissitudes of climate depend, being confined within the narrowest limits possible. Although the earth's eccentricity varies only between narrow limits, yet, as Mr. Crall has shown in his work entitled "Climate and Time," this slight change, in its rela-

tion to other influences, is sufficient to produce a glacial epoch alternating from one hemisphere to the other, thus giving the widest possible range to the distribution of species, as affected by climate, without utterly annihilating them.

There are some remarkable relations between the motions of the planetary orbits, pointed out by Mr. Stockwell, which serve to reduce the effects of perturbations to a *minimum* quantity. These relations seem to depend on the relative positions and magnitudes of the planets. Whether they have ever resulted from gravitation has not been demonstrated. In many respects these relations are analogous to those observed in the orbits of Jupiter's satellites, and which are the result of the remarkable commensurability of their motions, noticed on a previous page. Laplace succeeded in tracing this relation of Jupiter's satellites to the action of gravitation only on the assumption that such a relation was *very nearly* established at the commencement of their motion. Very likely the relation about to be mentioned depends on a primitive "collocation" of the major planets, such as to indicate Divine interposition. The relation seems to answer the purpose of a balance-wheel in the system. The perihelion of each planet has a motion in space caused by the attraction of all the other planets. This motion is exceedingly slow, and in some cases very irregular. Mr. Stockwell succeeded in proving that the motions of the perihelia of Jupiter and Uranus, referred to the "invariable plane," are equal to each other, being between three and four seconds of an arc, and performing a revolution around the heavens in 384,730 years, and continuing, on an average, 180 degrees apart. The same fact is observed in the motions of the first three satellites of Jupiter. Saturn's orbit, lying between those of Jupiter and Uranus, performs a revolution in one sixth of this time, while Neptune requires six times as long.

By virtue of this singular relation the orbit of Saturn is affected only by the *difference* of the perturbations by Jupiter and Uranus; whereas if the mean places of the perihelia of these two planets were the *same*, instead of differing by 180 degrees, the orbit of Saturn would be affected by the *sum* of these disturbing forces. But notwithstanding this favoring condition, the elements of Saturn's orbit would be subject to very great perturbation from the superior action of Jupiter,

were it not for the comparatively rapid motion of its perihelion, "its equilibrium being maintained by *the very act of perturbation.* The mean disturbing influence of Uranus on the eccentricity of Jupiter's orbit is identically equal to nothing by reason of the relation which exists always between the perihelia of their orbits." The mean motion of Jupiter's node on the invariable plane is exactly equal to that of Saturn, and the mean longitude of these nodes differs by exactly 180 degrees. By reason of the rapid motion of these nodes the secular changes of the inclination of the orbit of Uranus pass through a complete cycle of values in the period of 56,300 years. The corresponding cycle of perturbations in the eccentricity of Saturn's orbit is 69,140 years. "It is the rapid motion of the orbit, with *respect* to the *forces*, in the one case, and the rapid motion of the forces, with *respect to the orbit*, in the other, that gives *permanence* of *form* and *position* to the orbits of Satur- and Uranus."

The spheroidal form of the earth and planets which Laplace and others urge as one of the consequences of the nebular theory has an important bearing on the *extent* of variation of equator and ecliptic. The actual limits are $2\frac{1}{3}$ degrees, only slightly affecting the seasons, which depend on this angle. If the earth were not spheroidal, but spherical, the inclination of the ecliptic to the equinoxial would vary to the extent of $12\frac{4}{15}$ degrees. While the earth's orbit vibrates through several degrees, the attraction on the protuberant matter of the equator draws it down toward the plane of the orbit.

Mr. Stockwell, reflecting on the phenomena of the solar system, connected with its stability, makes the following observation: "A system of bodies moving in very eccentric orbits is one of manifest instability; and if it can also be shown that a system of bodies moving in circular orbits is one of unstable equilibrium, it would seem that between the two supposed conditions a system might exist which should possess a greater degree of stability than either. The idea is thus suggested of the existence of a system of bodies in which the masses of the different bodies are *so adjusted to their mean distances* as to insure to the system a *greater degree of permanence* than would be possible by *any other distribution of masses.*"

The grand progressive scheme of life, as revealed by geology,

requiring vast ages for its development, clearly points to the perpetuity of the solar system as an indispensable requisite. This *adjustment* of the physical system—in view of the many perturbing influences which threaten its existence—to the system of life, incapable of enduring great vicissitudes, must be regarded as a striking proof of a Divine Intelligence in creation and preservation.

Laplace criticises Newton for indulging in speculations which connected the Almighty with the solar system, while he himself framed an hypothesis virtually excluding him from the realm of nature. The Christian philosopher will do well to imitate the devout spirit of Newton, the great discoverer of the law of gravitation, rather than the irreverent spirit of Laplace, its greatest expounder.

ART. VII.—SYNOPSIS OF THE QUARTERLIES AND OTHERS OF THE HIGHER PERIODICALS.

American Quarterly Reviews.

BAPTIST QUARTERLY, October, 1876. (Philadelphia.)—1. The Literary Elements in Theology. 2. Horatio Balch Hackett. 3. The Future of Catholic Nations. 4. Education among the Baptists of this Country during the Last One Hundred Years. 5. Progress of a Century. 6. Modern Evolution Theories.

BIBLIOTHECA SACRA, October, 1876. (Andover.)—The Madonna Di San Sisto. 2. The Synthetic or Cosmic Philosophy. 3. Recent Works Bearing on the Relation of Science to Religion. 4. The Immortality of the Human Soul. 5. An Exposition of the Original Text of Genesis i and ii. 6. The Idea of God in the Soul of Man. 7. Dale on the Atonement.

CHRISTIAN QUARTERLY, October, 1876. (Cincinnati.)—1. Baptism and Christian Union—the Real Question. 2. Animal Life. 3. Faith in the Unseen. 4. Materialism. 5. The Work Assigned to Faith. 6. Baptism for Remission of Sin is Justification by Faith. 7. Behold the Man. 8. Foreign Missions.

NEW ENGLANDER, October, 1876. (New Haven.)—1. The Influence of the Crusades upon European Literature. 2. The Belfast Address in another Light. 3. The Last Century of Congregationalism; or, the Influence in Church and State of the Faith and Polity of the Pilgrim Fathers. 4. The New Theology. 5. Mr. Lettsom's Version of the Middle German Epic. 6. *Logos and Cosmos:* Nature as Related to Language. 7. Necessary Truths and the Principle of Identity. 8. On some of the Relations between Islam and Christianity. 9. Muller's Rig Veda and Commentary.

NEW ENGLAND HISTORICAL AND GENEALOGICAL REGISTER, October, 1876. (Boston.)—1. Memoir of Charles W. Moore, Esq. 2. The Field Family of New Jersey. 3. Notes on American History. Nos. IX–XII. 4. The Garrison Family of Massachusetts. 5. Gleanings. No. 69. Capt. John Ayres. No. 70. Farrars and Brewers of Essex County, Mass. 6. Deaths in Stratham, N. H., from 1741. 7. Extracts from the Diary of the late Hon. William D. Williamson. 8. Ab-

stracts of the Earliest Wills in Suffolk County, Mass. 9. The Second Foot Company of Newbury, 1711. 10. Memoranda from the Rev. William Cooper's Interleaved Almanacs. 11. Record of the Boston Committee of Correspondence, Inspection, and Safety. 12. Samuel Allen of Windsor, Conn., and his Descendants. 13. Baptisms in Dover, N. H., 1717–66. 14. Abstracts of the Earliest Wills in Middlesex County, Mass. 15. Passengers and Vessels to America. 16. Ancestry of Admiral Porter.

NORTH AMERICAN REVIEW, October, 1876. (Boston.)—1. The Southern Question. 2. Whisky Ring. 3. Von Holt's History of the United States. 4. An Episode in Municipal Government. 5. The "Independents" in the Canvass.

PRESBYTERIAN QUARTERLY AND PRINCETON REVIEW, October, 1876. (New York.) 1. American Methodism in 1876. 2. The Indian Question. 3. Our Indian Policy Further Considered. 4. Organization of the Fundamental Principles of Social Science. 5. The Organic Unity of the Church. 6. The Great Awakening of 1740. 7. The Revivals of the Century. 8. Recent German Works on Apologetics. 9. Philosophy and Science in Germany. 10. Current Notes.

QUARTERLY REVIEW OF THE EVANGELICAL LUTHERAN CHURCH, October, 1876. (Gettysburg.)—1. Of Confession. 2. An Hour with the Fathers. 3. The Theological Seminary of the General Synod. 4. Protestantism and Catholicism in their Influence upon the Liberty and Welfare of Nations. 5. Our Home Mission Work in Cities. 6. Additional Remarks on the Ministerium.

UNIVERSALIST QUARTERLY, October, 1876. (Boston.)—1. Beauty in Common Life. 2. Egyptian Book of the Dead. 3. The Avesta. 4. Immer's Hermeneutics of the New Testament. 5. Luther and Schleiermacher as Preachers. 6. Tyndall and Martineau; or, the Debatable Ground between Materialism and Religion. 7. The Polity of the Universalist Church.

AMERICAN CATHOLIC QUARTERLY REVIEW, October, 1876. (Philadelphia.)—1. The Church and the People. 2. What the Church and the People Have Done for the Science of Geography. 3. The Past and the Present Indissolubly United in Religion. 4. A Plan for the Proposod Catholic University. 5. The Nine Days' Queen. 6. Who is to Blame for the Little Big Horn Disaster? 7. How Shall we Meet the Scientific Heresies of the Day?

We have received the first four numbers of this stately Quarterly, and looked over its pages with gratification. In our country, where the Protestant principle of the right of private judgment prevails, it is desirable to hear the highest and best utterances of those who deny that right. No little ability of thought and grace of style appear in its pages. Besides fine literary articles, there are able defenses of our common Christianity, skillful argumentations in behalf of Roman peculiarities, and, we may add, sharp aggression upon Protestant communions, among which Methodism comes in for a very explicit share.

The Roman communion, like its elder and more authentic sisters, the Syriac and the Greek Churches, erred not so much by the corruption of primitive doctrines as by spurious additions to them. The Reformation of the sixteenth century was an attempt, very honest and to a great degree successful, to fling off the later and spurious, and fall back upon the primi-

tive and pure. It aimed to discard the modern and retain the ancient. Hence Protestantism is more ancient and primitive than Romanism. The primitive truth contained in Romanism, and in the written canon preserved by the Roman as well as by the other Churches, is essential Protestantism.

Among these Roman novelties, most pre-eminent in spuriousness and pregnant with danger, is the ascription to the Bishop of a single city of a supremacy over all other Bishops, culminating in a final ascription to the same prelate of the attribute of "infallibility"! The city selected as the theocratic city was the old Pagan Rome! This strange anomaly really arising from the fact that Rome was the politically imperial city, was theologically based upon the late and fanciful myth that St. Peter was once a Bishop there; and under pretense that the attributes of Peter descend along the whole descending line of Roman Bishops, we honest American Christians are called upon to abdicate our own reason and conscience, and accept the pronouncements of the present Roman Bishop in their stead. This is a decidedly tall demand. It calls for a very tall pile of resistless reasons authenticating itself. But the reasons are not impressive. Most well read and thoughtful Protestants recognize upon their very face ample warrant for prompt rejection, excusing us from wasting time in any extended examination.

Old Hugh Broughton remarks that Rome is not a favorite locality in biblical estimation. In the Apocalypse it is uniformly Babylon, an antitheocratic city, doomed to destruction. The great red dragon of Paganism has his native home in Rome. And Gibbon somewhere gives us a splendid passage picturing the fact that the stupendous pagan political empire of Rome was succeeded by a spiritual empire of deeper despotism, longer duration, and wider extent. And on the very surface of the Apocalypse we have the same fact pictured to the most transient eye. The great red Roman dragon of seven heads and ten horns is succeeded by the Roman beast with seven heads and ten horns. How far the scrutiny of details would verify the first impressions we will not now inquire. We only say that the first impressions are profoundly suggestive.

But the greatest practical Roman error, that which opens the deepest and broadest chasm between her and Catholic Christendom, is her claim to punish doctrinal dissent with physical

inflictions. Roman Catholicism is thus a standing vocal menace against the religious freedom of the world. We quoted a few years ago, from the "Catholic World," the assertion of the right of the Church to punish physically those who were "criminal in the order of ideas;" in other words, to kill us if we refuse to be Romanists. And lately, a leading French Catholic said to the Protestants, "You are bound by your principles to tolerate us, we are not bound by our principles to tolerate you." What is the proper reply to such a statement? Our reply would be, We are bound to tolerate you as Romanists in the exercise of your own religion, but we are not obliged to tolerate you as menacers of our rights to the exercise of our religion. In the last character you are secular enemies, to be guarded against, defeated, and punished. If they reply, *But this claim to not tolerate you is part of our religion;* then we must answer, *So much the worse, for then no Protestant principle requires us to tolerate even a religion that menaces our religious freedom.* Prudentially, the tolerance should be maintained so far as safety allows; but in dealing with a religious communion bound by irrepealable pledges never to tolerate where there is power to inflict, we can never forget what the law of self-preservation requires.

Roman Catholicism, so far as it is Catholic, is doubtless Christian: so far as it is Roman, it is deeply pagan.

SOUTHERN REVIEW, October, 1876. (Baltimore.)—1. Christian Theology. 2. Mind and Matter. 3. Caroline Herschel. 4. The Theistic Conception of the World. 5. Robert Emmet. 6. Capital Punishment. 7. Louisa, Queen of Prussia. 8. The Heart of the Continent. 9. The Teachings of our Lord in Regard to a Future Life.

Dr. Bledsoe accepts the work of the Joint Commission at Cape May in the following frank and whole-souled style:—

In our humble opinion the Joint Commission which recently met at Cape May to adjust the difficulties between the two Methodist Episcopal Churches of this country have done a great and good work. Indeed, we have always been in favor of "an era of *good feeling*" between the two Churches, provided it were, at the same time, an era of *just principles;* and such an era we now have reason to believe has been inaugurated by the action of said Commission. As to the books by Myers and Fuller, which we intended to dissect and discuss in this number of our Review, they may now fight out their own battle in their own way. We have buried the hatchet. We are more than satisfied with the work of the

Joint Commission. God grant it may prove a permanent blessing to both Churches, and to the people of America!

Dr. Summers notices the work of the same Commission in the following bitter and accusatory way:—

The plan of fraternity is intended to be a finality, so far as the points agreed upon are concerned. We expect to keep it in good faith, as we did the Plan of Separation. But we are not sure that the Northern General Conference so intended, or, if it did, that its successor in 1880 will be bound by it. We are reminded of 1844 and 1848.

We fear the good doctor will die of that fatal "Plan of Separation," and that he will die with the fictitious phrase muttering upon his lips. Dear doctor, there never was any "Plan of Separation." The document, untruly so-called, was also repealed by our General Conference of 1848, for the reason, fully assigned and formally evidenced, that the Church South had repeatedly violated it. Dr. S. very well knows that our Church earnestly denies having committed any such breach of faith as he here charges, and his reiterating such a charge at this point is an unfraternity which endangers his right of objecting, as he so often does, that utterances on the part of northern editors are unfraternal. We should like to see the editor of the Nashville and of our Northern shake hands as the two representative Bourbons of their respective Churches.

English Reviews.

BRITISH QUARTERLY REVIEW, October 1, 1876. (London.)—1. Secular Changes of Climate. 2. Dean Hook on the English Reformation. 3. The American Centennial. 4. Disestablishment and Disendowment. 5. American Ecclesiastical Law. 6. The Turks in Europe. 7. Daniel Deronda.

LONDON QUARTERLY REVIEW, October, 1876. (London.)—1. The Microscope and its Revelations. 2. The Holy Spirit in the Epistle to the Ephesians. 3. The Problem of Human Existence. 4. Philosophy in Ancient India. 5. Wordsworth's Prose Works. 6. Retribution. 7. America in the Centennial Year.

LONDON QUARTERLY REVIEW, October, 1876. (New York: Leonard Scott Publishing Company, 41 Barclay-street.)—1. Strawberry Hill. 2. The Arctic Regions and the Eskimo. 3. London Alms and London Pauperism. 4. The Papal Monarchy. 5. The Suez Canal an International Highway. 6. Pictorial Illustrations of Shakspeare. 7. The Turkish Empire. 8. The Life of the Prince Consort. 9. The Eastern Question and the Government.

WESTMINSTER REVIEW, October, 1876. (New York: Leonard Scott Publishing Company.)—1. Indian Affairs: Recent Legislation. 2. William Godwin. 3. Political Economy as a Safeguard of Democracy. 4. Lord Althorp and the First Reform Act. 5. Shakspeare's Young Men. 6. Political Development and Party Government.

EDINBURGH REVIEW, October, 1876. (New York: Leonard Scott Publishing Company.)—1. Bancroft's Native Races of North America. 2. Secret Correspondence on Marie Antoinette. 3. The Declaration of Paris. 4. Sir Philip Sidney. 5. Dr. Smith's Dictionary of Christian Antiquities. 6. Daniel Deronda. 7. Morality without Metaphysic. 8. Depreciation of Silver. 9. Bosnia and Bulgaria.

In a notice of a book on Byron, by Mr. Minto, the "Westminister" has the following startling hint touching Mrs. Stowe's publication in regard to that part:—

It was perhaps necessary that he should make but scant allusion to Byron's daughter Allegra, the story of whose brief life is so intertwined with that of one still living; and he is perhaps right in dismissing with all but silent contempt the scandal bruited by a "celebrated living authoress who was slightly acquainted with Lady Byron." We warn Mr. Minto, however, that he may find it necessary to revert to these unsavory matters, as there are those in London who profess to speak with authority, and murmur the scandal still.—P. 285.

The following critique on Stanley's "Jewish Church" (noticed in our Book-table) is suggestive of both the position and ability of Stanley:—

It would not be easy to find among the books of this year one which presents us with more delightful reading than the third volume of Dean Stanley's "Lectures on the Jewish Church," occupied with the period from the Captivity to the Christian Era. Whether we agree or disagree, it is impossible not to be fascinated by Dean Stanley's picturesque style, by his extraordinary wealth of illustration, by the power with which, without effort, he shows likeness as well as unlikeness in the struggles and difficulties of old days to those of our time, by his large-hearted sympathy. We do not, indeed, look in Dr. Stanley for the careful striving after accuracy which distinguishes such writers as Ewald or Kuenen. We distrust at times his brilliant generalizations, and the conclusions which he draws from picturesque phrases in prophet or psalm; but both for the scholar who uses this book as a rapid survey of that which he has already gained by slow, laborious work, or for the general reader who desires that the result of other men's reading should be put clearly and broadly before them, the book is invaluable. For the first time, and in the compass of less than two hundred pages, the Jewish history from Judas Maccabeus to the dawn of Christianity is presented to us in a manner entirely free from confusion and difficulty; while the earlier part of the history, and the manner in which the thoughts of other creeds filtered into and mingled with the Jewish faith, are placed before us with keen insight and careful research. In a book so valuable we do not like to hint at defects; but in one point we find the same fault that runs through the whole of

Dr. Stanley's works, and renders them unsatisfactory to those who desire to know the stand-point of the teacher from whom they learn so much. Whenever Dr. Stanley speaks of the miraculous he gives an uncertain sound. He indulges in poetic phrases which, whether meant to do so or not, disguises his real opinions, and we rise from the perusal of the book totally unable to say whether the writer intends us to believe in miracles, or to regard them as entirely the creation of a later time. This is especially the case in the present volume in regard to the account of Belshazzar's feast. The relation is animated, brilliant, even impassioned; but we are wholly at a loss to know whether Dr. Stanley believes that the writing on the wall, if it were really there, was formed by the hand of man or by the divine hand. When will our liberal divines say what people look for on this point? Instead of ambiguous utterances, we look for plain statements, as plain as are Dean Stanley's assertions that he does not hold, with the High-Church party, that the Christian minister is descended from the Jewish priesthood and their "mechanical, bullock-slaying, fumigating ministrations." With the style in which the "Lectures" are written we have one fault, and only one, to find. The dean, like Lord Macaulay, is too allusive. His books are no mere magazine articles, which would die with the month or the year in which they are produced, but should be permanent when the mere *brochures* of the day are forgotten, and the allusions of the day are known no more. He should not, therefore, speak of the Book of Judith and its imaginary invasion in these terms: "It is a romance intended to inspire the Israelite maidens with a sense of their duty in case of a new foreign invasion; even as in our own days an imaginary battle in the hills of Surrey was intended to delineate in the possible future the needs of England under like circumstances."

We trust that the "Lectures on the Jewish Church" will be read when the "Battle of Dorking" has, as must be the case in spite of its brilliancy, wholly passed out of mind; and though such references give vivacity to the style, they cannot but in some measure detract from the value of the permanent volume. But enough of fault-finding. The book is, on the whole, thoroughly worthy of its author's reputation; and if he will only speak his opinions, whatever they may be, distinctly and plainly about the miraculous, we trust that he will carry his labors into the yet more difficult and dangerous ground on the borders of which he has halted.—Pp. 243, 244.

BRITISH AND FOREIGN EVANGELICAL REVIEW, October, 1876. (London.)—1. Schleiermacher Interpreted by Himself and the Men of his School. 2. The Apologetic Function of the Church in the Present Time. 3. Romanism in the United States. 4. On the Translation of Galatians iii, 20, and Hebrews ix, 16, 17. 5. The Ecclesiastical History of Ireland. 6. The Scientific Doctrine of Continuity.

The Third Article is one of several discussions of the character of the United States which have appeared in different British reviews drawn forth by our centennial, characterized

generally by great accuracy of statement, and universally by great fairness of spirit. The writer treats his subject with the more accuracy from the fact of a two years' residence in the country not long ago.

We were struck with a passage, written by a Calvinist, probably a minister, in a theological journal, noticing the New York NATION. The spirit of favorable anticipation with which such a man names the NATION contrasts suggestively with the bitter and malignant meanness with which the NATION has treated men of his class. We quote his words to show how he (as we also for a while) too favorably mistook the character of that paper:—

> The "New York Nation," which is conducted by Mr. Edwin Godkin, an Irishman, has been trying, with some success, to put down the system of mean and malignant depreciation by which the newspapers are generally polluted and disgraced, by showing the example of a dignified but effective journalism, which proscribes all base advantages, and adjusts quarrels by the laws of honor and chivalry.

The NATION did at the first speak in its political editorials with so stern an ethic in regard to public men, even of its own professed party, that, in spite of its persistent semi-infidelity, (if the *semi* is not surplusage,) we did, for some time, consult its columns as a politico-ethical oracle, and inclined to form severe opinions of any man it condemned. But the oracle has proved an imposture. For the last few months it has become the unflinching apologist of political knaveries. It has disclosed so genuine an affinity with public dishonesties that we assign it a permanent place in the ranks of what Horace Greeley once so piquantly and truly dubbed the "Satanic Press." Of Protestant evangelical Christianity it has generally spoken only to sneer; of the Protestant evangelical ministry it has very uniformly spoken only to insult. We can call to mind a few instances. Years ago it maintained that ministers were unfit to be educators by reason of that moral effeminacy by which women and clergymen are classed together. More lately it warned the ministry not to express any public opinion as to the innocence or guilt of Henry Ward Beecher, inasmuch as their habits of mind disqualified them for right judgment of the force of evidence; that quality, we suppose, being the

high prerogative of newspaper paragraphists like Mr. Godkin. Still more lately, in several pages of twaddle, it advises the ministry not to publicly discuss the subject of evolution, for here, too, their studies disqualify them for logical discussion. We have only to say that the American Protestant ministry has within its limits as learned and able a body of thinkers as any existent profession, whether legal, medical, or editorial. When the editor of the NATION undertakes, time after time, to teach that profession its manifold incompetencies, he only shows himself a very conceited addle-head. Any minister who is imbecile enough to go to the NATION for counsel in his duties deserves the insult he is sure to encounter.

CONTEMPORARY REVIEW. Eleventh Year. Strahan & Co., Paternoster Row. London.

Dr. Rigg's article in this number furnishing a history of the position of John Wesley in regard to the Church of England and to Church government in general, exhibits full ability and mastery of the subject. It fully sustains the true Wesleyanism of the present position of English Methodism. He demonstrates the conclusion that "Wesley not only pointed but paved the way to all that has since been done, and that the utmost divergence of Methodism from the Church of England at this day is but the prolongation of a line the beginning of which was traced by Wesley's own hand." And he concludes with the following significant paragraph:—

> It is manifestly now too late to think of the reabsorption of Methodism into the Church of England, for English Methodism is not only itself now a large and consolidated communion, but it has been the fruitful mother of many other communions—of the Methodist Episcopal Church of the United States, by far the largest Protestant Church in America, (perhaps in the world,) and of Colonial Methodist Churches and Mission Churches almost without end—not to mention the seceding Methodist Churches in both hemispheres. With such a family of Churches derived from itself, that parent stock of Methodism, which claims direct descent from John Wesley, and which has hitherto walked more strictly in his counsels than any of the offshoot Churches, is never likely to consent to merge its own identity or annul its historical position.—P. 681.

Dr. Rigg makes the following noteworthy statement in regard to our own episcopacy:—

In his independent organization of American Methodism, he [Wesley] embodied in general his own ideal of an independent Methodist Church.—P. 673.

In full view of this concession we have some surprise to express at Dr. Rigg's published utterances from our late General Conference, hostile, to a partisan degree, against our episcopacy.

German Reviews.

THEOLOGISCHE STUDIEN UND KRITIKEN. (Theological Essays and Reviews.) 1877. First Number. *Essays:* 1. RIEHM, The Idea of Atonement in the Old Testament. 1. KÖSTLIN, State, Law, and Church in Evangelical Ethics. *Thought and Remarks:* KLEINERT, Remarks on Isaiah xx–xxii and 2 Kings xviii–xx. *Reviews:* 1. LANGE, History of Materialism, reviewed by SCHMID. 2. SIEGFRIED, The Task of the History of Old Testament Exegesis at the present time, reviewed by RIEHM.

Professor Julius Köstlin, now one of the editors of the *Studien und Kritiken*, has established, by a number of able works, especially his biography of Martin Luther, (see Methodist Quarterly Review, 1876, p. 780,) the reputation of being one of the foremost theologians of Protestant Germany. He begins in this number a series of articles on the rights and duties of secular governments, especially with regard to the religious and moral interest of mankind. It is time, he thinks, for Protestant theology to subject the prevailing theories of the essence, boundaries, and estimation of the State to a new examination; for on the answer given to these questions will depend the solution of the old problem of the relation between State and Church, and the modern problem of the relation of both State and Church to the great social questions of the day. In the first article the passages of the Bible relating to State authorities, the opinions of Luther and the other reformers of the sixteenth century, and the views of modern Protestant writers on ethics are stated. Among the writers whose views are stated at length are Wuttke, (*Sittenlehre*, 3d edit., by L. Schulze,) Stahl, (*Philosophie des Rechts*, and *Staats und Rechtslehre*,) Mühler, late Prussian minister of ecclesiastical affairs,(*Grundlinien einer Philosophie der Staats und Rechtslehre nach evangelischen Principien.* 1873,) Rothe, (*Theologische Ethik*, 2d edit.,) Schleiermacher, Alexander Vinet, Beck, (*Kirche und Staat*,) Vilmar, (*Theologische Moral*, 1871,) Harless, (*Staat und Kirche*,) Oettingen, (*Christliche Sittenlehre*.)

Art. VIII.—FOREIGN RELIGIOUS INTELLIGENCE.

THE ROMAN CATHOLIC CHURCH IN EUROPE.

From a comparative work on the States of Europe by one of the best living statisticians, Professor Brachelli, (*Die Staaten Europas*, 3d edit., Brünn, 1876,) which is now in the course of publication, we extract the following statistical summary of the Roman Catholics in Europe:—

"The supreme ecclesiastical power in the Roman Catholic Church is exercised by its head, the pope, in Rome, who is assisted by the college of cardinals. The pope enjoys the position and all the honors of a sovereign, and, in accordance with an ordinance of 1059, is chosen for life by the college of cardinals among its own members by a two-thirds majority of the electoral votes. The election takes place on the eleventh day after the decease of a pope, in the Vatican palace, in the so-called conclave, a wholly secluded place, which the cardinals are not allowed to leave until the new pope is chosen. The candidate for the papal see must be at least fifty-five years old, and not have any bodily defect of importance; otherwise the cardinals are only bound by an oath to make a choice according to the best of their knowledge. This includes the duty not to elect the candidate which the Catholic governments of Austria, France, Spain, and Naples, according to the vote of exclusion belonging to them, may designate as not acceptable. The pope-elect assumes a new name, is proclaimed to the people, is accustomed, in accordance with tradition, to confirm certain laws, and receives the consecration, the pallium, and the tiara from the bishop of Ostia, as dean of the college of cardinals. The pope has the title of 'Holiness,' or 'Holy Father.' He possesses a numerous court, and confers four orders of knights: 1. The order of Christ, which was founded in Portugal, recognized by the pope in 1320, and is conferred upon persons of the highest rank; 2. The order of St. Gregory the Great, which was founded in 1831, and has four classes; 3. The order of Pius, for all religious denominations, founded in 1847, and containing three classes; 4. The order of St. Sylvester, which was established in 1871, and comprises three classes. The order of the Holy Sepulchre, which was founded in 1099, and in 1868 divided into three classes, is conferred in the name of the pope by the Latin patriarchs of Jerusalem; and the ecclesiastical order of the Knights of St. John of Jerusalem, which was founded in 1118, is likewise under the auspices of the papal chair. The relation of the pope to the kingdom of Italy has been regulated by the law of May 13, 1871. According to it the person of the pope is sacred and inviolable; the Italian government renders to him sovereign honors, and guarantees to him an annuity of 3,225,000 lire, and the enjoyment, free from taxes, of the Vatican and Lateran palaces and the villa of Castel Gondolfo, which places are not subject to the jurisdiction of the State,

and endowed with the rights of immunity, as well as those rooms which are temporarily occupied by the pope, or in which a conclave or a council are held. The pope shall not be impeded in the full exercise of his ecclesiastical functions. In the same way the free intercourse of the Holy See with the Episcopate and the entire Catholic world is guaranteed. The embassadors of the pope, and those of foreign powers accredited near him, enjoy the privilege of the law of nations.

The cardinals constitute, under the presidency of the pope, the sacred college, in which important affairs of the Roman Catholic world are discussed. The college of cardinals is divided into three classes: The cardinal-bishops, (6,) the cardinal-priests, (50,) and the cardinal deacons, (14.) The first and third classes have their permanent residence in Rome; to the second class belong a number of cardinals, who in other cities occupy the position of archbishops or bishops. The oldest cardinal-bishop is the cardinal-dean, with various honorary rights. The cardinal-chamberlain makes the necessary preparations for the conclave, and governs with the heads of the three classes of the college during the vacancy of the papal chair. The cardinals are appointed by the pope, have the rank of princes of sovereign houses, and bear the title 'Eminence.' "

Under the pope the ecclesiastical power is exercised by archbishops and bishops. The archbishops are also, as metropolitans, placed over one or several episcopal dioceses, which, in union with the archbishop's diocese, constitute an ecclesiastical province. In this respect the archbishops rank the suffragan-bishops. Some bishops are exempt from the metropolitan jurisdiction of archbishops, and are immediately subordinate to the pope. The vicars-apostolic and prefects-apostolic, who depend immediately upon the pope, as well as the abbots and prelates, (*nullius dioceseos,*) also enjoy episcopal jurisdiction. The archbishops may hold provincial councils, and the bishops diocesan synods, in accordance with the Church laws. The former, which are presided over by the metropolitan, and composed of bishops, prelates, and other clergymen of high rank, have a concurrent power in questions of ecclesiastical legislation; while the latter, consisting of the provosts, parish priests, and heads of monasteries, appear solely as clerical assemblies of the diocese with advisory powers. The ecclesiastical authorities of the Roman Catholic Church of Europe were, in 1876, composed as follows:—

Countries.	Archbishops.	Bishops. Suffragan.	Bishops. Exempt.
Austro-Hungarian Monarchy	14	47	..
Germany	5	14	6
Great Britain and Ireland	5	37	1
France	17	67	..
Italy	19	148	69
Russia	1	8	..
Sweden and Norway	..	..	..
Denmark	..	..	..
Netherlands	1	4	..
Luxembourg	..	..	1
Belgium	1	5	..
Switzerland	..	..	5
Spain	9	45	..
Portugal	8	16	..
Greece	2	4	..
Turkey	4	4	..
Total	81	399	83

Of vicars-apostolic there are: 3 in Germany, 1 in Austria, 4 in Great Britain and Ireland, 1 in Sweden and Norway, 2 in Roumania, 4 in Turkey—total, 15. Of prefects-apostolic: Germany, Sweden and Norway, Denmark, and Switzerland, each have 1; and of abbots (*nullius diocesecos*) Austria has 1, Italy 11, Switzerland 2, and Monaco 1.

The secular and regular clergy in the several countries numbered, in 1876, the following:—

Countries.	Secular Clergy.	Monks and Members of Religious Congregations.	Nuns.
Austro-Hungarian Monarchy	24,400	9,398	7,678
Germany	18,300	1,933	16,666
Great Britain and Ireland	5,000	....	....
France	43,000	17,776	90,843
Italy	100,000	....	....
Russia	6,000	....	....
Netherlands	2,060	815	137
Luxembourg	350	....	....
Belgium	5,000	2,991	15,205
Switzerland	2,000	550	1,880
Spain	40,000	719	12,990
Portugal	10,000	....	1,500
Total	256,110	....	....

If these figures are compared with the Roman Catholic population, it will be found that the proportion of priest to population is as follows:—

Countries.	No. Inhab'ts for every Priest.	Countries.	No. Inhab'ts for every Priest.
Italy	267	France	823
Spain	419	Belgium	1,050
Portugal	436	Austro-Hungarian Monarchy	1,144
Switzerland	540	Russia	1,200
Luxembourg	571	Great Britain and Ireland	1,320
Netherlands	680		
German Empire	812	Total	9,262

The following is the proportion of monks and nuns to the Catholic population:—

Countries.	No. Rom. Cath. for every Monk.	Nun.	Countries.	No. Rom. Cath. for every Monk.	Nun.
Netherlands	1,530	....	German Empire	7,600	900
Belgium	1,630	325	Spain	21,760	1,200
France	1,970	390	Portugal	....	2,900
Switzerland	2,000	590			
Austro-Hung. Monarchy.	2,970	5,637	Total	39,460	11,942

In Italy all monasteries and ecclesiastical congregations were abolished by royal decree of July 7, 1866. The monasteries of male orders and congregations were suppressed in Portugal in 1834, and in Spain in 1841. In the latter country, however, the orders and congregations devoted to foreign missions, education, and the nursing of the sick, were exempted from the prohibition. In Sweden and Norway the establishment of monasteries is not permitted by law. In Switzerland the Federal Constitution forbids the reception of Jesuits, and of any congregations affiliated to them in any part of the confederation; also the estab-

lishment of any new, and the re-establishment of abolished, monasteries. Germany, by an imperial law of July 4, 1872, excluded the Jesuits; and Prussia, by a law of May 31, 1875, all ecclesiastical congregations except those which devote themselves to the nursing of the sick. In Hesse, a law of April 23, 1875, provided that new establishments of religious orders shall not be admitted into the grand duchy, and that those now existing, except female orders devoting themselves to education, shall not be permitted to admit new members. Only congregations which occupy themselves with nursing the sick are not included in the provisions of the law. In the kingdom of Saxony there are only two monasteries of Cistercian nuns, and the establishment of new monasteries is prohibited for all time. In the kingdom of Wurtemberg and the grand duchy of Baden, the establishment of any new monastery requires a special authorization by the government.

The Greek Oriental Church.

In the Greek Oriental Church, which also calls itself the Orthodox, and in Russia and Turkey the Greek Catholic, the constitution is different in the several States. In Russia its head is the emperor, under whom the highest ecclesiastical power is exercised by the Holy Synod, the members of which, both clerical and lay, are appointed by the emperor. The bishop of Montenegro receives his consecration from the Russian Synod. In Turkey the ecclesiastical power is vested in the Ecumenical patriarch of Constantinople and the Holy Synod. The latter consists of the four metropolitans who carry the patriarchal seal, and of from six to eight other metropolitans who are called by the patriarch; but all the Greek bishops who are present in Constantinople can take part in its deliberations. The national Churches of Roumania, Servia, and Bulgaria are dependent upon the patriarch of Constantinople in doctrinal matters, but are otherwise independent. In each of these three countries the ecclesiastical power is in the hands of a Synod, which in Servia consists of the bishops, and in Roumania and Bulgaria of the bishops and archbishops. In Greece the Church is ruled by a permanent "Holy Synod," and in the Austro-Hungarian monarchy by an "Episcopal Synod," the monarch in both countries having the chief superintendence. The "Holy Synod" of Greece consists of five members, who are either bishops or other high ecclesiastical dignitaries; the Synod of Austria is exclusively formed by metropolitans and bishops. In the Austro-Hungarian monarchy there are three different ecclesiastical provinces: one in Austria proper, with a metropolitan at Czernovitz, in the Bukovina; and two in the lands of the Hungarian crown, of which one, with a metropolitan at Carlovitz, is for the Servian, and the other, with a metropolitan at Hermannstadt, is for the Roumanian nationality. The bishops of each province form a Synod, under the presidency of a metropolitan. All the bishops of the monarchy, moreover, unite in a General Synod, in which the metropolitan of Carlovitz is the presiding officer. The latter bears the title of a patriarch, and in ecclesiastical affairs all

the bishops of the empire are subordinate to him. In each of the three provinces Church Congresses are occasionally held, consisting of the bishops and representatives of the clergy and laity. In the administration of his diocese every metropolitan, archbishop, and bishop is assisted by a consistory. The statistics of this Church, in 1876 were as follows:—

Countries.	Metrop's & Archb'ps.	Bishops.	Secular Priests.	Monks.	Nuns.
Austria proper	1	2	362	....	....
Hungary	2	8	3,100	200	....
Russia (inclusive of Asiatic provinces)	16	32	50,758	10,862	14,707
Greece	16	15	4,661	1,830	150
Roumania	2	6	9,702	4,762	4,076
Servia	1	3	712	122	....
Turkey	49	51	....	..	....
Montenegro	..	1	....	....	....
Total	87	118	....	....	....

The proportion of the secular clergy and monks and nuns to the total population is as follows:—

Countries.	No. of Inhabitants for every Secular Priest.	Monk.	Nun.
Austro-Hungarian Monarchy	884	10,900	....
Russia	1,060	5,000	3,700
Greece	350	900	10,000
Roumania	420	857	1,008
Servia	1,900	1,1000	....
Total	4,614	28,657	14,708

Art. IX.—FOREIGN LITERARY INTELLIGENCE.

The revised and enlarged edition of Herzog's "Theological Cyclopedia," the first number of which has just been issued, will be welcomed throughout the Protestant world. (*Real-Encyclopedie für Protestantische Theologie und Kirche.* Leipsic, 1876.) This work, the first edition of which was begun in 1853 and finished in 1863 with the eighteenth volume, (exclusive of several supplementary volumes published afterward,) gave to Protestant Theology its first worthy representative in the literature of Cyclopedias. While in nearly all departments of scientific theology the Protestant Churches have run ahead of Roman Catholicism in the province of comprehensive theological Cyclopedias, Catholic Germany was already in the field when the work of Herzog was begun, having produced two works, Aschbach's *Allgemeines Kirchenlexicon*, (1846–1850, 4 vols.,) and Wetzer's and Welte's *Kirchenlexicon*, (1846–1860, 12 vols.,) which, in spite of the biased stand-point from which they are written, contain a number of articles of recognized value. As Protestant Germany contains an infinitely larger number of eminent scholars than Catholic Germany, it was to be expected that this work of Professor Herzog would exceed in scien-

tific value its Catholic predecessors and rivals. That this expectation has been fully realized, even very few Catholics will at present dispute. Herzog's Cyclopedia has forever secured a high and honorable position in theological literature, and in the literature of special dictionaries. Works of this kind are invariably of greater importance and value for their own than for foreign countries. They cannot be expected to treat the affairs of foreign countries with the same fullness, nor even with the same accuracy, as those of their native land. Herzog's work forms no exception to this rule. Many of the articles relating to foreign countries are disproportionately meager, and America in particular occupies so little space that the German work is not only altogether insufficient to supply the wants of American Protestants, but, even from a German stand-point, it seems to us, a country like the United States, which has a larger Protestant population than any other country of the globe, should have received a more prominent attention. It was to be expected that an attempt made in this country to translate Herzog's work would fail, not only because the war interrupted the publication, but still more, because no sufficient provision had been made to supply the utter insufficiency of its American department. The Cyclopedia of Drs. M'Clintock and Strong, which, while carefully using the excellent articles in Herzog, Aschbach, Wetzer and Welte, aimed at an equal fullness in its American department as the German work possesses in its German department, was, therefore, a real want of American literature, and it is creditable to the Protestant Churches of the United States that they have produced the second great Protestant Cyclopedia. Protestant France has waited until 1876 before a work of similar comprehensiveness (Lichtenberger's *Encyclopédie de Theologie*) was begun ; (see "Methodist Quarterly Review," Oct., 1876;) and England has up to this time not been heard from, though it has produced a number of smaller compends. Although we cannot bestow our approval upon the American department of Herzog's Cyclopedia, we cannot too warmly recommend its general excellences. The world-wide fame of German theology, which draws, in increasing numbers, theological students from the United States, England, Holland, France, and all other countries, to the German universities, has been honestly earned and is fully deserved. No one has ever looked into the foremost theological publications of Germany, be it in the original or in translations, without giving a ready and thankful recognition of the profound and unparalleled scholarship by which they have been produced. Herzog's Cyclopedia is one of the masterworks, perhaps the greatest, of German theology. It is, really, a vast theological library in itself, containing the important results of the ripest scholarship in all departments of theology. The new edition will be edited by Professor Herzog and Professor Plitt, both professors at the University of Erlangen. It will comprise fifteen volumes of eight hundred pages each, and is to be completed in about eight years. The list of contributors embraces among others the theologians Dillman, Dorner, Ebrard, Gass, Harnack, Jacobi, Kahnis, Keim, Köstlin, Lechler, Lutt-

hardt, Julius Müller, Piper, Reuss, Ritschl, Schweizer, Thiersch, Tholuck, Zöckler of Germany, Bersier and Pressensé of France, Oosterzee of Holland, Schaff of the United States, the jurists Hermann, (president of the Supreme Ecclesiastical Council in Berlin,) Friedberg, Hinschius, Dove, Mejer, and Wasserschleben; the Egyptologist Lepsius; the Orientalist Spiegel. The first number contains a number of articles which have been thoroughly revised by their authors or by other scholars, (some of them had appeared in the first supplementary volume, or the nineteenth volume of the whole work,) as *Alpha and Omega*, by F. Piper; *Abbadie*, by C. Schmidt; *Abendmahlfeier*, (celebration of the Lord's Supper,) by Stähelin; *Abgaben Kirchliche*, (Church Rates,) by Mejer. Some articles have been entirely rewritten by other authors, and substituted for the articles of the first edition, as *Abendmahl*, (Lord's Supper,) by Burger and Herzog; *Aberglaube*, (Superstition,) by R. Hofman; *Abessininische Kirche*, (Abyssinian Church,) by Lüttke. It cannot, of course, be expected that all articles in a work like this should be of equal excellence. Thus, in the article on the *Abyssinian Church*, the history of the Protestant and Roman Catholic missions is too meager, and the ample literature on Abyssinia, which was called forth by the English-Abyssinian war, should have been noticed more fully; for as Volz, in an interesting essay (which we think deserved itself a mention in the article of the Cyclopedia) on *Die Christliche Kirche Aethiopiens*, in the *Studien und Kritiken*, 1869, (see a synopsis of this article in the "Methodist Quarterly Review," 1869,) showed, it contained a considerable amount of new information on the Abyssinian Church. But imperfections like this are the merest trifles in comparison with the general thoroughness which characterizes all the articles of this number, and which leave no doubt that the new edition of Herzog's Cyclopedia will be an entirely new work, and so rich in new matter that even all the owners of the old first edition will be anxious to obtain also the new one. To the theological seminaries of our country, in particular, the new edition of Herzog's Cyclopedia cannot be too strongly recommended; their library will be incomplete without it.

ART. X.—QUARTERLY BOOK-TABLE.

Religion, Theology, and Biblical Literature.

Lectures on the History of the Jewish Church. By ARTHUR PENRHYN STANLEY, D.D., Dean of Westminster, Corresponding Member of the Institute of France. Third Series. From the Captivity to the Christian Era. With two Maps. 8vo., pp. 549. New York: Scribner, Armstrong, & Co. Price, $4.

This third series of Stanley's magnificent survey of Hebrew history extends from the Babylonian era to the advent of Christ. It commences with a brilliant survey of the power and downfall of

Babylon, depicting that downfall as a great epoch in history, the demise of Shemitic supremacy, and the first ascendency of the Aryan or Japhetic race under the Persian Cyrus. The return of the Jews to their native land, the days of the later prophets, the close of the Persian period, and the influence of Persia and Zoroaster on the doctrines of later Judaism, are traced through an obscure period with a luminous hand. Alexander the Great, one of the truly greatest intellects of history, closes the Persian and inaugurates the Grecian Period. Of the Grecian race and period, as Alexander is the greatest secular leader, so Socrates is shown to be the greatest spiritual phenomenon. The gradual infusion of Grecism into Judaism, especially in their confluence at Alexandria, produced the Greco-Jewish books of the Apocrypha, and resulted in the Greek translation of the Old Testament called the Septuagint. Then arose the Maccabees, and the illustrious Jewish age of the Asmonean family, bringing us to the epoch when John the Baptizer announced the Advent. Upon this entire period between the Return and the Advent, over which the learned Prideaux shed his accurate but tedious erudition, Stanley pours the light of modern study, given in a style of gorgeous splendor, fascinating the reader's attention, and leaving vivid pictorials upon the memory.

The two traits that deeply mark Stanley's work are the broad *comprehensionism* by which he gathers into one Church all the good of all climes and ages as the true elect, and the strong *negativism* with which he seeks to reduce all supernaturalism to a minimum or a nihil. With his *comprehensionism* we can largely sympathize. From our old Hollandic Arminian ancestry, through Wesley and Fletcher, down to Pressensé and Cocker, we are able to hold that myriads in all lands are saved by a universal atonement to them historically unknown. We are open to all the most cheering lessons of the new comparative theology. And so far is this new and pleasing view from diminishing our missionary zeal, it rather cheers our missionary in his work, and endows him with a new skill in kindly meeting all there is good in heathendom, and revealing unto it a still more excellent way.

Far less do we sympathize with Stanley's negativism. He sets slight value on the opening chapters of Genesis, emphasizing the fact that no allusion is made thereto in all the subsequent Hebrew canon. He easily discards traditions of authorship, and subjects the sacred books to the freest criticism. Zechariah and Isaiah both he cuts in two, and assigns one part to some unknown author. The

book of Daniel was written in Palestine forsooth in the age of the Maccabees. And now if you suppose that by these appalling surrenders the very foundations are all destroyed, he delights to show what a priceless and indestructible residue remains. The part is better than the whole. For let criticism have all its say, and tumble about the documents as it pleases, you have but to compare the Jewish records with any other literature of antiquity to see that they are impregnated with a strange divinity. The people stands alone a deeply inspired race. That people, through its legislators, prophets, and psalmists, was the front leader of humanity into the empyrean regions of spiritual truths; truths which, easily conceding to criticism and science all they claim; remain indestructible. And, then, centrally, but not alone, Hebraism is the prophetic antecedent of the divine Prophet of our and all faith.

Having rejected the creational and Adamic myths of Genesis, Stanley rather rejoices in Darwinism. He is pleased with the conception that man has acquired possession of the noblest faculties and divinest truths by long aeons of development. Those intuitive truths of God, holiness, retribution, and especially of *immortality*, the race has been enabled to grasp by successive growths. With advancing time these priceless gems of divine truth will shine to the eye of the soul with a clearer luster and a surer reality. And it is not by Judaism alone, but by Zoroastrianism, and Buddhism, and Hellenism, that contributions to this divine treasury have been made. If there is an intenser spiritualism, a loftier solemnity, a deeper inspiration in Hebraism, still there is one truth, that of *immortality*, that Hebraism but faintly uttered before the captivity had schooled her in the eastern lores, to which the Grecian Socrates gave the most distinct pronunciation. And, then, in a most beautiful chapter on Socrates, he shows how wonderfully the wonderful philosopher illustrates the prophets of Israel, yet even in his highest phases is their inferior. And from all the ages and races the rays converge upon One whom all the wise of every race are growing to acknowledge as the Prophet and teacher of all.

For the richness of the hues flung on sacred history we recommend to all our thoughtful ministers the reading of Stanley, checked by safer authorities, such as Keil's Introduction and Pusey on Daniel.

Exodus; or, the Second Book of Moses. By PETER LANGE, D.D., Professor of Theology in the University of Bonn. Translated by CHARLES M. MEAD, Ph.D., Professor of the Hebrew Language and Literature in the Theological Seminary, Andover, Mass. 12mo., pp. 141. New York: Scribner, Armstrong, & Co.

Leviticus; or, the Third Book of Moses. By FREDERIC GARDENER, D.D., Professor of the Literature and Interpretation of the Old Testament in the Berkeley Divinity School, Middletown, Conn. In which is incorporated a Translation of the greater part of the German Commentary on Leviticus. By PETER LANGE, D.D., Professor of Theology in the University of Bonn. 12mo., pp. 206. New York: Scribner, Armstrong, & Co.

It will be noted that both Exodus and Leviticus are issued from the exegetical hand of Dr. Lange himself. There is a general Introduction by him unfolding what Dr. Schaff calls "an original and ingenious view of the organic unity and trilogy of the Three Middle Books of the Pentateuch and their typical import." The work done by the American annotators, as usual, is not the least valuable part of the volume. We again heartily congratulate our biblical brethren on the advance toward completion of a work so honorably uniting the biblical scholarship of Germany and America.

Philosophy, Metaphysics, and General Science.

The History of Creation; or, The Development of the Earth and its Inhabitants by the Action of Natural Causes. A Popular Exposition of the Doctrine of Evolution in General, and that of Darwin, Gœthe, and La Marck in particular. From the German of ERNST HAECKEL, Professor in the University of Jena. The Translation Revised by Professor E. RAY LANKESTER, M.A., F.R.S., Fellow of Exeter College, Oxford. Two volumes, pp. 408, 374.

Atheism plus Darwinism equal Brutalism; the beastliest philosophy that ever nightmared the human soul. We have never, indeed, said that Darwinism was necessarily Atheism, as Spencerism is; we have even endeavored to show that the Darwinian need not reject Moses. But Professor Haeckel, taking the nebular theory for his cosmogony,* and Darwinism for his biology, educes all existence from the primitive essence of unconscious matter, and thus brings out Atheism of the most pronounced kind. To the primary Dualism of God and nature, mind and matter, he opposes the "*Monism*" of essential matter alone; and he writes this eloquent, frank, and learned book to demonstrate that this one Primitive is alone needed for the entire problem of the universe. The rule of a just, benevolent intelligence, or of any intelligence at all, over the world, immortality, free-will, responsibility, essential soul, are

* It is to be noted that Haeckel admits that he cannot account for the commencement of rotary motion required in the nebular theory.

all rejected as the infantile conceptions of the world's non-age. By necessary laws primitive matter has developed into a great synthesis of things rising into a tall pyramid, of which, by conditions favorable to him, man, the *ex-ape*, is the *apex*.

To Haeckel's solution through Darwinism of the problem of nature we decline to concede the very first starting-point. Two things he assumes as his great premises, namely: Heredity, by which like begets like; and Adaptation, by which exact likeness is varied to the demands of surrounding conditions. Heredity preserves the uniformity and permanence of species so far as they exist, and Adaptation secures their unlimited variation in time and space; so that, given but a single animal organism to start with, all the ranks of living nature can be accounted for. Now, to an Atheist, or Monistic denier of antecedent overruling mind, no concession can be made of Heredity or Adaptation. Both are intellective terms, terms that implicitly affirm material substances, overruled by anterior and superior mind.

Were the universe a vast mass of orderless chaos, an indiscriminate slag, it would afford no proof of an overruling mind. We agree with Chalmers, that the proof for a God arises not so much from the existence, as from the "collocations," the orderly arrangements of matter. The moment this slag shapes into symmetrical plans—plans not consisting of geometrical shapes, but plans whose parts correspond on an intellective selective principle—we have phenomena that presuppose selective mind and will. And this distinction between the geometrical and the selective is here very important. Matter might be supposed by its own necessities to tumble unconsciously and undirectedly, like crystals, into geometrical form, though we do not concede that crystals do so. But an organism like a human body, with parts combined upon a plan to execute obvious purposes and ends, can be only mind-shaped. The correspondent parts are not *necessarily* resultant, but are selected and located on an alternative and volitional principle. This presupposition of intellective plan increases when there is added a subserviency of plan to utilitarian results; further increases with the increased amount of plans, complexities, and utilitarian results; and illimitably increases when an immense system is contemplated, over which any great all-pervading Purpose is seen as grasping into subordination to itself an infinite number of subordinate purposes. Now Heredity implies a symmetrical contingently shaped organism produced regularly by a preceding similar organism, and such organisms are mind-molded objects. If we judge things, as we must,

by their properties, this organism presents three phases: *first*, a substance which by its properties appears to be materialistic; *second*, a correspondence of parts, or a selective plan, which is volitional; and, *third*, a subordination of the materialistic to the intellectively volitional, by which it is constructed and overruled. An Atheist has no right, therefore, to assume Heredity as a premise to account for any results whatever. He has no right to any such intellective volitional terms as plan, organism, type, laws, and such like, for these are all intellective and volitional terms, implying that matter is preceded, shaped, and overruled by mind.

The doctrine of an evolution of created things in gradual historic series, unified as one great whole, has always been maintained since thought has begun to contemplate the subject. The Bible contains an outline of an evolution. Pope's "Essay on Man" contains a complete system of mundane evolution. John Wesley was an evolutionist. The problem of human and brute immortality Wesley solved by conceding immortality to brutes. "Wesley," says Dr. Stevens, "believed that there was a regular gradation of creation from the animalcule to the archangel; 'an opinion,' says Southey, 'confirmed by science as far as our physiological knowledge extends.' He also thought it probable that each class in the series advances, and will forever advance, men taking the rank of angels, and *brutes the rank of men*, and eternal progress and felicity be thus the lot of all saved beings."—*History of Methodism*, vol. ii, p. 422. Here is an evolution more complete than Darwinism presents; including apparent Darwinism itself in the words we italicise. Theistic Darwinism is apparently not very anti-Wesleyan. But generally the evolutionism of past times embraces all life in a great unit, produced by successive creations in accordance with a law subjective to the divine mind, objective in the created unit.

Professor Haeckel's work is not only a "history," it is a romance, an epic. His mastery of the science enables him to collect and group an immense number of facts in form favorable to his theory. And so convinced is he of the inductively certain truth of the theory as a whole, that he skillfully and abundantly fills all inconvenient blanks with hypothetical facts, facts made to order. That is, his view of the whole system is so clear that he can tell you with fair probability what the missing facts are. The omitted link is conclusively indicated by the very nature of the hiatus. He believes that man is not so properly descended from monkeys as from an earlier genetic point, from which the monkey

branch and man branch diverge. He indicates the very geographical spot where man began to emerge from brute. It is now submerged by sea, lying beneath the waters between the promontory of India and the shores of Africa. This is the scientific Paradise. And he gives us a splendid map on which are traced the lines of humanizing descent, starting from the primitive point and diverging over all the continents and islands of the earth. His whole work flows forth in a strain of rich and variegated eloquence. The translation is a model of lucidity.

Haeckel spreads out in description and picture the wonderful fact in Embryology, that the human *fœtus* in the womb passes successively through the forms of fish, reptile, and quadruped before fully forming into the final man. We have every one of us in our unborn state gone through these metamorphoses. And this, with all Darwinists, he claims as proof that the human race is generatively descended and derived through these successive gradational races. It certainly is a wonderful parallelism. But it seems to be only illustration; it is no proof. There is no logical or causative relation discernible between the two lines of succession. The embryo, in its successive transformation, is an image or picture of the evolutional transformation through which the external animal world passes. One shows no causation of the other, and the embryonic series only illustrates the fact that there is an order of creation. But be it specially here noted, it does not illustrate *a generative order.* The succeeding stage of the *fœtus* is not *born* of the preceding stage. It fails, therefore, in the very vital point of illustrating the *generative* descent of later animal species from earlier. The embryonic stages are produced simply by changes of the relative positions of the molecules, but these changes do not embrace the process of sexual concurrence, parturition, and birth. If I take a mass of putty and manipulate it through exactly the same changes of form, I have precisely imaged the embryonic image of external evolutionary animal developments, and the successive stages are most surely not genetically connected. The successive changes of shape, that is, the successive changes of molecular position, are produced by the interposition of the formative forces proceeding from the hands. The process is an admirable image of and comment on the Mosaic text of the creative order of succession. It illustrates the divine fact that man is a microcosm, a miniature of the macrocosm, summing up all his created predecessors in himself, and rising in himself above them all. If there had been so many successive births in the

womb of successive *fœtuses*, it would have been an illustration of Darwinism. But being only a formal *succession*, so far as it is proof it establishes a formative, but not generative, succession.

But whatever the external *form* of a human *fœtus*, it never was at any stage a real fish, or tortoise, or dog. From the first seminal element to the birth it was a man and nothing else. That is, there resided in the human seminal essence at the first the formative power, superior to and overmastering all its forms, which did not reside in that of the lower animals, and which was human first and last, and sure to produce a man. Prof. Haeckel can snuffle at that immaterial superior formative power as much as he pleases; true reason recognizes its existence as a supreme fact, for which his philosophy does not account.

But the theory of a mind-formed, mind-ruled world is stigmatized by Haeckel as *anthropomorphism*. This is a popular taunt with thinkers of his class. Spencer, with a clumsy jest which proves that sarcasm is not one of the gifts of his most serious nature, calls it "the carpenter theory of creation." And Tyndall objects to Clerk-Maxwell's calling matter a "manufactured article," as derogatory to the Infinite. It is a curious conscience that shows such sensitiveness to a supposed insult to a supposedly non-existent entity! It is a still more curious notion of dignity that rejects the *anthropomorphic*, and substitutes therefor a *mechanomorphic* theory, as if unintelligent mechanism were more dignified than intellective man. It increases the dignity immensely, forsooth, to strike from a creative or formative agency the attribute of intelligence and reduce it to idiocy! If ours is an anthromorphic, theirs is a *moro-morphic*, a *fool-formed* theory. If instead of in effect calling God here a "carpenter" we substitute *architect*, a term essentially identical, yet incidentally more esthetically dignified, Spencer's sarcasm loses all its point; for both poetry and oratory have ever delighted to call God the "architect of creation." And why should a genius so radical and essentially democratic as Spencer's appeal to the low conventional contempt of "a carpenter," as if there was not something truly divine in the humblest act of mind shaping matter to intelligential form and benevolent use? How infinitely superior to this unseemly snobbishness is that most divine conception of our Christian religion which narrates that the Son of God was putatively a "carpenter's son" and himself a "carpenter!" What a flash of unexpected grandeur does that fact let down upon our most humble lowliness, revealing to our view the sublime truth that man, in the legitimate

use of his noble faculties, is, in spite of homely conventionalities both in nature and act the image of God! God is anthromorphic because man as productive mind is theomorphic. But it is false that our theory is anthropomorphic any more than theirs. For if an intelligential origin is anthropomorphic because *man possesses the attribute of intelligence*, it follows that their own mechanical or force *origin* is anthropomorphic, for surely *man possesses the attribute of force.* Newton, it is said, no matter whether truly or not, constructed his theory of universal gravitation from seeing the fall of an apple; and so gravitation is *appleomorphism!* His problem was to account for the motions of the astronomic system, and of all the systems of the universe; and he found the solution in the apple moving to the earth. That appleomorphic solution he extended to immensity. With us the problem is to account for the apparently intelligential forms and combinations that make up the universal system. We find it in *nous, intellect;* that intellect revealed to us most clearly in our own finite mind; just as Newton found attraction in the moving apple. And just as Newton extended his appleomorphism into explaining the gravitation ruling all existing things throughout immensity, just so we as legitimately extend our anthromorphism into an explanation of the intelligent forming and ruling all existing things. Most surely if we cannot be allowed to explain the infinite by finite instances, all extended reasoning is at an end. But what right have these men to maintain that there is no intellect but human intellect? Or, still more, what right have they to charge us, who do not limit intellect to humanity, with holding an anthropomorphic theory, because we hold the intelligential theory? We hold that *intelligence*, in its own nature, irrespective of any finite *intelligent*, solves creation. Ours is not specially the *anthromorphic*, but the *intelligenceo-morphic* theory. We hold, and none can disprove, that intelligence belongs to higher natures than man. Intelligence is in itself not only anthropomorphic, but it may be angelo-morphic, archangelo-morphic, nay, theomorphic. The Force philosophers of the present day find Force exemplified in special finite instances, and they generalize it to infinity. The Intelligence philosophers find intelligence exemplified in given finite instances, and they generalize it in the same way into infinity. And as the Intelligence philosophers recognize this universal Force presented by their brother philosophers, so they also recognize that said Force does operate according to intelligential methods, produces intelligential shapes and movements, and appears to act under the guidance and control of Intelli-

gence. They generalize, then, most legitimately, that this universal identity of Intelligence-ruled Force is God. It is God unlimited, so far as we know, in Power and Wisdom; God omnipotent and omniscient. And inasmuch as this limitless Force of our brother philosophers is not prevented by its infinity from acting in the most minute quantities, and producing the most minute effects, so God omnipotent is under no difficulty, and no disqualification, arising from his great dignity, in manufacturing an atom, or carpentering a world. God omnipotent finds no difficulty in creating a hair. All the metaphysics about the impossibility of the finite being produced or moved or modified by the Infinite is infinite humbug.

As to the moral attributes of God, Haeckel is trenchant and destructive. Life through all its ranks is hate, war, and destruction; and all living species can say with Job's messengers, "I have alone escaped to tell thee." Over a pessimism like this does there reign, he asks, a benevolent God? It is, indeed, terrible; and Haeckel deems the negative conclusion self-evident. But a few hundred pages further on, near the close of his last volume, he relents. Some misgivings seem to arise that his theory is too hateful for human acceptance, and he feels it necessary to irradiate it with a few optimistic hues, very relieving to its horrors, and quite contradictory to his logic. In this exterminating struggle for life, he graciously assures us, lies the assurance of human progress. Ever and ever *it is the fittest who survive;* and therein lies a future of human elevation in which, relieved from all fear of God, the race will be interminably great and glorious. Happy atheistic millennium! But, alas! we reply, neither he nor we will be there to see. With our ancestral snails, toads, and apes, we shall have tumbled into that abyss of nothingness from which no future recollection will ever recall our image, and even the denizens of that millennium will be perpetually tumbling in after us. But that optimism is the very argument which, with far more force, the theologians use to defend the goodness of God, who permits evil, indeed, but only because from the permission of evil he can educe a transcendent good; a higher good, on the whole, than if the evil were not permitted. It is our theology which proclaims not only an advancing progress and an earthly millennium, but points to glory and eternal life as the crowning evidence of divine goodness in the history of the world. For our race our theology argues a vast amount of existing earthly happiness, for otherwise death would not be terrible. We all consent and desire to live

because we enjoy; and when faith, hope, and love animate us, our hearts exult aboundingly in contemplation of that goodness of God against which Atheism blasphemes. To the Atheist the world is rightly pessimistic, and God is truly a terrible God. What wonder that he who hates God should realize that God abhors him? Pessimism and Atheism are twin brothers.

Lessons from Nature as Manifested in Mind and Matter. By ST. GEORGE MIVART, Ph.D., F.R.S., Professor at Kensington and Lecturer in St. Mary's Hospital. 12mo., pp. 462. New York: D. Appleton & Co. 1876.

In reply to certain taunts from the scientists that he was writing under a theological bias, Dr. Mivart informs us that he was really educated in scientific rationalism, but took refuge from its repulsive doctrines in the Roman faith. His "Genesis of Species" gave the first check to Darwinism, and laid down some important doctrines which have not since been invalidated. We specify particularly the following points:—

1. Though evolutionary development be true, yet the changes from one species to another are not always by slow degrees, but by sudden, great, and even revolutionary transformations.

2. The new forms are not accidental, but are evolved by an inherent rational formative potency.

3. Man being first formed by an intellective transformation and the infusion of a high rational soul, was truly *created;* derivatively *created*, indeed, yet still *created* in strict accordance with the Mosaic history.

4. That this view is neither novel nor heretical, but is essentially an old doctrine maintained by many of the ablest old divines of the Catholic Church. Those eminent doctors did not, indeed, teach the full doctrine of universal evolution, but of a "derivative creation" of which evolution is only an expansion. The full doctrine of evolution is, therefore, consistent with the most ultra Catholic orthodoxy, and, therefore, *à fortiori*, is allowable in ordinary Christians.

The old doctrine of Augustine, Thomas Aquinas, and Suarez was, that organisms are often endowed with a productive or creative potency from which new species are evolved. Thus parasites are somehow produced from the organism on which they depend. If Adam was created pure and perfect, how did lice come into existence, except as evolved from the degenerate human body? And so, said the fathers, there spring insects and worms from putrefaction—that is, in fact, by spontaneous gener-

ation; for spontaneous generation, though now rejected as heresy by both theology and science, was once orthodox with both. But these views, according to Mivart, established as orthodox the doctrine of "derivative creation;" and evolution is simply derivative creation universally extended.

Many of the fathers, including Augustine, denied the literality of the Mosaic days. They held that the whole mundane system was created at once; and that the six days were not a succession in time, but an order of thought. This was held by a large series of the Church doctors, from Augustine to the present day, long before geology raised any objections to the literal interpretation.

To Mivart's doctrine of the "derivative creation" of man by formal transformation from a lower animal and infusion of a higher soul, Mr. Huxley replies as follows:—

> If man existed as an animal before he was provided with a rational soul, he must, in accordance with the elementary requirements of the philosophy in which Mr. Mivart delights, have possessed a distinct sensitive and vegetable soul or souls. Hence, when the "breath of life" was breathed into the man-like animal's nostrils, he must have already been a living and feeling creature.—P. 442.

To this Mivart gives the following reply:—

> This doctrine was that the human fœtus is at first animated by a vegetative soul, then by a sentient soul, and only afterwards, at some period before birth, with a rational soul. Not that two souls ever coexist, for the appearance of one coincides with the disappearance of its predecessor—the sentient soul including in it all the powers of the vegetative soul, and the rational soul all those of the two others. The doctrine of distinct souls, which Professor Huxley attributes to me as a fatal consequence of my hypothesis, is simply the doctrine of St. Thomas himself. He says (quæst. lxxvi, art. 3, ad. 3:) "Dicendum quod prius embryo habet animam quæ est sensitiva tantum, qua ablata advenit perfectior anima quæ est simul sensitiva et intellectiva ut infra plenius ostendetur." Also (quæst. cxviii, art. 2, ad. 2:) "Dicendum est quod anima præexistit in embryone, a principio quidem nutritiva postmodum autem sensitiva et tandem intellectiva."—P. 443.

The last sentence we translate as follows: We should say that there exists in the embryo a soul, which at first is merely vegetative, afterward sensitive, and finally intellective.

This doctrine of ascending souls bears a curious anticipative relation to the discoveries by modern embryology of the ascending transition of form through which the fœtus passes up to man. The vegetative soul first appears in the evolution of and from the ovum; the animal soul evolves the fœtus through the animal forms; the rational soul is complete with the completion of the human form. Yet the lower soul is not destroyed, but is immerged into the higher, so that all three are identified in the highest.

This vegetative soul is rightly so called as reigning not only

over the animal, but also over the vegetable world. It supplies the growing and formative energy. It is the "plastic power" of Cudworth. It implies no sensibility in the subject, and is to be explained only as the divine omnipotence working under the form of finite causations and successions.

The animal soul, the soul of all brute life, consists in the energy of the five senses, with the circumscribed power of conception, comparison, and inference, among sensible objects.

The rational soul consists in the power of supersensible intuition, beholding truths not made up of sensible impressions, but transcending the level of sensible objects; such truths as infinity, God, holiness, and Ego.

In man these three are three and one.

Professor Huxley, with his usual dashing chivalry, pounced upon Mivart's "Genesis of Species," and even bravely dipped into Suarez, and claimed to show that that author did not teach Evolution. But, as often, his chivalry proved to be Quixotery. Our author shows that he understands neither Suarez nor Mivart. The writings of Mivart are highly lauded in the Catholic world. They are presented and accepted as *a*, if not *the*, full reconciliation between Genesis and science. They show how a one Adam may have been created in full consistency with Evolution; how, in full possession of a rational soul and the endowment of the blessed Spirit, man may have been created in pure and paradisaic conditions; how the fall of man may be still a historic truth; and how, unless archæological facts contradict, the Hebrew chronology may be held as valid. The views of Augustine, held by him exegetically and without knowledge of geological difficulties, if adopted, entirely vacate all difficulty in the Mosaic cosmogony. Those who wish to appreciate Mivart fully must read both the "Genesis of Species" and this volume.

Phonetic and Stenographic Short Hand: A Scientific System of Sound and Sight Writing. By Rev. THOMAS MITCHELL. 16mo., pp. 108. New York: J. W. Pratt. 1876.

Mr. Mitchell's system is based upon what he calls the incorporation of vowels with consonants. He has six consonantal alphabets, the first of which consists of consonants simple followed by no vowel; the five others embrace, severally, consonants followed by five vowel elements; so that in writing the consonant you also write the vowel. This is an ingenious invention; but it must be decided by the practical writer how far it is on trial a practical success.

History, Biography, and Topography.

The Great Republic; from the Discovery of America to the Centennial, July, 1876. The History of the Great Republic considered from a Christian Stand-point. Revised. By JESSE T. PECK, D.D., LL.D., one of the Bishops of the Methodist Episcopal Church. With thirty-four Steel Portraits. 8vo., pp. 704. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1876.

This new and beautiful edition, revised and improved by its author, furnishes a lucid and eloquent view of our national history from our earliest origin to the present time. It is written in the true spirit of piety and patriotism—of loyalty to the government founded by Washington and his compeers, loyalty to the principles of freedom promulgated in our Declaration of Independence, and loyalty to God, who is recognized as guiding our historic pathway. It is a work worthy to be placed as both a school and an ecclesiastical class-book in our courses of study.

Honor to whom honor is due. We believe it is Dr. J. T. Peck who first publicly suggested an Ecumenical Union of Methodism. He drew out a plan some years ago which will be found monumentally on record in a former volume of our "Quarterly Review."

Politics, Law, and General Morals.

Apthorp's Standard Map of Florida, constructed from the latest United States Surveys and from other Official and Local Sources, by WILLIAM APTHORP, late Chief Clerk of the United States Surveyor General's Office. 1877. Scale, 15 miles to the Inch.

This is the latest, largest, and most accurate Map of Florida extant. It is more accurate both from its access to the most thorough surveys, and from its exhibiting the newly risen towns and initiated railroads. We have received it from Col. J. B. Oliver, who has established in this city a paper entitled the "Florida New Yorker." This paper furnishes to the inquiring Northerner who is attracted toward the "Land of Flowers" answers to the great variety of questions he is interested in asking.

By united concession of the leading men of both political parties the Presidential election in Florida was perfectly peaceful and free. It was not until the special interest of the country n Florida's vote drew Northern politicians down there that any disturbance took place. Meanwhile, in disproof of any danger there to Northern men of any shade of opinion, we may note that Florida is proud

of being the residence of Harriet Beecher Stowe; and deep in the interior is the town of Beecher, where Charles of the "Beecher family" luxuriates in his own orange groves fearless of molestation.

Literature and Fiction.

King Saul. A Tragedy. By BYRON A. BROOKS. 12mo., pp. 144. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1876.

Mr. Brooks has attempted in this drama, with no little poetical success, to reproduce one of the most impressive passages of Hebrew history. He holds that he describes "a period," and we might add a race, which was "much nearer the spirit-world than the present, so that the supernatural was natural." The solemn spirit of that age and race, under pressure of the supremacy of the present Jehovah, was strikingly analogous to the spirit of stern overruling fate that reigns in the Grecian drama, and is well represented in the present "tragedy." The character of the seer, Samuel, of the young and aspiring David, of the lofty, yet fated Saul, are delineated with life. The successive scenes are well selected, move with stirring rapidity, and are vividly drawn. The interview of Saul with the sorceress of Endor tasks the writer's powers, and it is here that his poetic ability most decisively appears, in the mastery of so difficult a problem.

The great biblical era awakened by the International Lessons has called out, even in our hebdomadal periodicals, many a commentator; why should it not inspire at any rate one poet? We recommend Mr. Brooks's "Tragedy" to all readers in biblical literature, being assured that, as a poet, he quite equals any of the commentators created by the International epoch that we have read—which is saying nothing depreciatory of them.

Periodicals.

Southern Methodist Press on Negro "Intimidation."

Our brethren of the Southern Methodist press deny that there is any "intimidation," any attempt at disfranchisement of the Southern negro. The accuracy of this denial is to be tested by verified history and statistics; but what we now wish to discuss

and to place before them is, what we think of negro suffrage, and of the purpose attributed to the Southern whites by responsible thinkers of reducing the Southern negro to disfranchised serfdom.

Universal suffrage, unqualified by any conditions of property or character, we believe to be the great danger of our country. Hence, when the negro population of the South was enfranchised, we believed that such danger was encountered, if not a great wrong done. The greatness of that wrong is now under exhibition in the canvasses for presidential electors in the States of Louisiana, South Carolina, and Florida. When our Southern brethren exclaim, "We are overslaughed with a mass of unintelligent voters; we are being deluged with an uncivilization; we are a 'prostrate State,' calling for mercy," we appreciate and deeply sympathize with their case.

But let us turn the table. We are here in New York overslaughed with as terrible a mass of enfranchised ignorance and depravity as any State in the South. We would gladly swap our Northern Irishry for the Southern Negrodom. We would gladly say, for the city of New York, to the city of Charleston, "Take our Irishmen and give us your Negroes." For the State of New York we would make the same offer to South Carolina. Here in the combined cities of New York and Brooklyn the Tilden majority was over seventy thousand, overruling the rest of the State, which would have given an overwhelming majority for Hayes; would have given him the thirty-five electoral votes of New York; electing him at a stroke. Reverse twenty thousand ignorant, foreign, papistical Irish votes in these cities, and Tilden would not have had the ghost of a chance. It would then be, "As go these votes, so goes New York State, and so goes the nation." Here let us unite our hearts, brethren of the South and North, and say this is a terrible danger and wrong.

What renders this wrong more galling to us of the North is, the knowledge that this arbitrative vote is directed by a foreign power, with no interest in the real good of the country. The Democratic party of our State is governed by the Irishry, the Irishry by the priest, and the priest by the pope; and when the State is governed by the Democracy, it is, in an unknown degree, governed by a foreign power, directing the vote not for the country's interest, but for that foreign interest. More than one entire half of the Democratic State Convention of our "Empire State" was Irish Catholics. And to this foreign vote, as opposed to the so-called "Republican party," must be added the organized "liquor inter-

est," which holds that party as a temperance party. And thus at the present moment it is popery and whisky, Rome and rum, which overslaughs the temperate, intelligent native population of the great State of New York.

Now if that native population should unitedly arm itself, if under guise of "rifle companies" they should quietly become a military power, they could conquer and disfranchise the unintelligent vote. And so to a Democratic friend who was boasting that there would be in the coming election "a solid South," we replied, "If we should shoot down Irishmen as facilely as the southerners can shoot down 'niggers' we could have a solid North." But that we are not likely ever to do. We have another remedy more becoming Republicans and Christians. Our purpose is not to fight it, nor violently disfranchise it, but to educate it. Our remedy is not "rifle companies," but schools and churches and temperance societies. Our method is to overcome evil with good. The grandson of the Irish papist is very probably to be a good native American Protestant. Time and patience in well doing, with God's blessing resting on such a process, will, we have the faith to believe, bring us right.

We may be answered by our Southern brethren that the existence of unqualified suffrage is our own fault; that the South never desired it, and the North alone is responsible for it. But that is a great historical mistake. It was, as we showed years ago, the South that forced unqualified suffrage on the North. It was the "Democratic party," of which Horace Greeley said "its brain and body is in the South, and its tail in the North," which created the unqualified suffrage under which we labor. In our earlier history it was from Southern "Democratic" statesmen, not from the Northern or "Federalist" statesmen, that the broadest maxims of "equal rights" and "universal suffrage" came. Those maxims, as they understood it, were, however, not to be applied to the Southern slaves, but only to the Northern undercrust. And it was the union of the Southern slaveholder with our Northern subterraneans that secured universal suffrage, and ruled both sections with "Democracy." We well remember when, in this great State of New York, qualified suffrage was the rule, and it was safe and right. But under the leadership of Martin Van Buren, the "Northern man with Southern principles," aided by the backing of the Southern oligarchic "Democracy," the votes of the unintelligent were purchased by enfranchisement. For this unkind favor from the South, the North has repaid the South with an

equal favor. As the South enfranchised the Irishry, the North has enfranchised Negrodom. Yet, in behalf of the North, we must call to memory one fact. The Republican party did hesitate to enfranchise the negroes. It offered to the South that *if the representation of the States in the Federal Government could be proportioned to the number of votes*, the voting qualification should be left to the decision of each State itself. That was fair. If a State diminishes the number of its voters, it should thereby reduce its amount of representation in the national unity. That proposition the South rejected. The policy of the violent men in the South seems to be to disfranchise by violence the unintelligent vote, retain the power in a *caste*, and yet claim a full representation in the Unity. That is a restoration of the old oligarchy. It is a wrong pregnant with future strife. It only substitutes serfdom for slavery; it points to a new sectional contest, with unknown yet fearful results.

Let us renounce this policy of violent disfranchisement. Drop the "shot gun" and take up the spelling-book. Do not fear that the educated negro will unduly aspire to social equality before possessing those qualities that render sociality inoffensive. Any one of our Southern brethren can tolerate a negro to wait upon his table; it is only when he sits down, even at the other end, that he smells bad. Some of them could, we hope, sit at table unoffended beside that accomplished scholar and elegant writer, Edward W. Blyden, even, perhaps, in spite of the consciousness of being his intellectual inferior. On the other hand, very few or none of us are fanatical enough to look to "miscegenation" as any attainable or desirable end. Meantime the negro is native born, is Protestant, is aspiring to education and civilization, is a patriot ready to vote for the country's good. He cannot be disfranchised permanently by fraud or force. Serfdom for him is no more possible than slavery. Conceding his civil and political rights, sociality is a matter of individual taste which no one is obliged to concede. But can there not be enacted by constitutional amendment a national *intelligence qualification* of suffrage applicable alike to all races and colors?

The South says to the North: *You are trying to rule us through our unintelligence.* The North replies: *You have long ruled us through our unintelligence.* What is the remedy? A union between the intelligence of North and South by which, with oppression to none, intelligence shall maintain its ascendency. We call for a parley. Let the good people of the North and South understand each other. With our native, educated, tem-

perate, Christian, national people, is the power to control if, forgetting sectional fights, they will unite. Back of our present cohort of politicians there is a people that can rule in the interest of advancing civilization if they can only attain unanimity. Let the Churches lead in this path of peace. Let interchange and intercourse, courtesy and kindness, take place. Let this fatal antithesis between North and South—that is, the North and South lying between the Atlantic and the Mississippi—be abolished. Let Mason and Dixon's line be obliterated. Let the platform of a great *Unanimity* of our true PEOPLE be, *suffrage based upon intelligence*, universal education, civil-service reform, temperance, and tolerant Christianity.

Since the above was given to the compositor we have read with pleasure a recommendation in the President's Message for the national adoption of a system of intelligent suffrage.

Haus und Herd. A German Family Magazine. HENRY LIEBHART, D.D., Editor. 8vo. Cincinnati: Hitchcock & Walden. New York: Nelson & Phillips. 1876.

Dr. Liebhart justly congratulates the Church and himself on the success of his "*Haus und Herd.*" It unites Germany and Methodism, Melanchthon and Wesley, in a highly delightful way. The number of its subscribers, we are informed, has steadily increased, until not only its existence, but its prosperity for the future, seems to be fully insured, and that in the face of a long-continued financial pressure such as this country has hardly ever experienced. We pray success and increase for our German Methodism, and fervently hope that it may prove a blessed antidote to German rationalism in the future of our country.

Pamphlets.

Methodist Fraternity. By ENOCH L. FANCHER. 12mo., pp. 19. New York: 1876.

In his early manhood it was the task of Judge Fancher, as junior counsel, to make up the case of our Church in its suit with the Church South. Probably no man living has followed the mutual relations of the two Churches with a more judicial eye. Never specially identified with aggressive antislavery men, yet realizing the evil of slavery, he has looked at both the ecclesiastical and political contest with the calmness and clearness of a

trained jurist. He was wisely selected as a member of the adjustive Commission, and his views here expressed, called forth by the eccentric action of the Central New York Conference, are a very conclusive refutation of the unhistorical statements and fallacious reasoning on which that action was based.

We are unaware of any action of our General Conference through its whole history by which it impugned the legitimacy of the Church South as a Church. On the contrary, the very proposal of fraternity presupposed the legitimacy of the body with whom it was proposed. Our Conference and our Church has repeatedly impugned the *righteousness* of the course pursued by the Church South. Her support of slavery and her withdrawal in behalf of slavery we ever have and do still condemn. But if unrighteousness always destroys the *legitimacy* of a Church, we fear that hardly a legitimate Church could be found extant. Our General Conference in 1844 conceded that the South might withdraw without ecclesiastical "blame." The Central New York Conference in our view, therefore, took issue not merely with the Commission, but with the General Conference through its whole history. The terms expressed by the Commission, we may add, contradict nothing which our Quarterly has ever maintained. On the contrary, we heartily indorse every clause and every word of its report as being perfectly in accordance with all we have said and thought. We have never uttered a syllable, or thought an idea, that denied the Churchdom of *any* now existing regular Methodist Church organization.

We have differed, however, with Judge Fancher as to the use of the term "secession." As he carefully defines the term, limiting it to an illegitimatizing sense, we have, indeed, never applied it to the action of any branch of Methodism. But the term "secession," it must be remembered, is a *vox media*, an intermediate term, susceptible, that is, of a good or bad meaning. Southern statesmen have claimed that politically "secession" was right. The Free Church of Scotland professedly "seceded" from the State Church. Older still, there is a Scotch sect of professed "Seceders," of which the scientist Faraday was an eminent member. An unjust or unlawful secession is a bad thing, but a rightful secession is a good thing. A few years since Dr. James Porter said in our Quarterly that if Bishop Andrew had not been inhibited from Episcopal functions while holding slaves the New England Conferences would have *seceded*. Thereupon some of our Southern editorial brethren flared up. So after all these charges of

secession against the South, they exclaimed, it is confessed that these treacherous Yankees would have "seceded!" Dr. Porter would have readily and truly replied that his condemnation of Southerners was not that they *seceded*, but that they seceded for wicked cause. New England secession, in his view, would have been in the cause of right, namely, justice and freedom; Southern secession was in the cause of wrong, namely, injustice and slavery. And so some years ago Dr. D. A. Whedon maintained in our Quarterly, rightly and conclusively, that the Southern withdrawal was a secession; a secession, that is, in distinction from the idea of a division of the Church by the General Conference into two co-ordinate but independent Churches, as claimed by Judge Taney's court; and, also, in distinction from the idea that the General Conference authorized the withdrawal of the Southern members in the Plan of the Committee of Nine; an idea lately reiterated by Dr. Myers, but not reiterated either by the Southern delegates to our General Conference, or by the Cape May Commission. It was, also, at issue with the inaccurate statement of the Southern Bishops when they boldly said at St. Louis, "We separated from you in no sense in which you did not separate from us." The separation, withdrawal, or "secession" was done *by them*, and on their own responsibility, only with a "Plan" that *after* it was so done by them, wrongly or rightly, we would not ever pass a certain line if they did not. The Plan had no effect or efficient existence until after the revolutionary secession was executed. In that secession they left the regular old organism; left to it its regular series of General Conferences, its old historic name, the archives and records of its history, and formed altogether a new organism commencing a new series. This, as men, citizens, ministers, Christians, they had "a right" to do, whether they rightly exercised that right or not. We are, then, different "branches of Methodism;" but our own old historic branch shoots up straight from the tap-root, through central trunk, to summit; while all the other "branches" glance off in a more or less graceful slant from this same primal center. All the branches are legitimate; one only is central, primordial, parental. It is an historical fact, that can be neither obliterated nor blurred, that every Methodist body on the American continent has *branched* off from that primal trunk, being either a branch or a branch of a branch.

Miscellaneous.

Journal of the General Conference of the Methodist Episcopal Church. Held in Baltimore, Md., May 1–31, 1876. Edited by the Rev. GEO. W. WOODRUFF, D.D., Secretary of the Conference. 12mo., pp. 663. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1876.

We have only room to announce this noble volume, and to say that, in our opinion, both the General Conference and the Editor, Dr. Woodruff, have well performed their work.

The Expositor. Edited by the Rev. SAMUEL COX. November. Contents: 1. The Book of Job. (The first Colloquy—Eliphas to Job.) By the Editor. 2. The Sixteenth Psalm. By the Rev. Professor M. ROBERTSON SMITH, M.A. 3. The Epistles of St. Peter. (The Second Epistle.) By the Rev. J. RAWSON LUMBY, B.D. 4. Dr. Pulsford on Ephesians. London: Hodder & Stoughton, 27 and 31 Paternoster Row.

This is a monthly Commentary on Scripture, to which contributions are made from some of the best biblical scholars of England. Annotations are prosecuted through a series of numbers on a single book. Besides the above-named writers, we notice in a previous volume the names of the late Bishop Thirlwall, Canon Farrar, the Dean of Canterbury, Dr. H. R. Reynolds, Prof. Plumtre, Dr. Oswald Dykes, and Rev. J. Hammond. Price per number one shilling sterling.

The Life of Marie Antoinette, Queen of France. By CHARLES DUKE YONGE, Regius Professor of Modern History and English Literature in Queen's College, Belfast, author of "The History of the British Navy," etc. 12mo., pp. 473. New York: Harper & Brothers. 1876.

The French queen, whose destiny it was to stand as one of the historical characters in whom mankind takes a permanent interest, is here portrayed from abundant materials by a friendly hand. One wishes to believe the favorable colorings true to fact. The character of La Fayette is presented in a more adverse light than usual.

The Orient and its People. By Mrs. J. L. HAUSER, Seven Years a Missionary in Northern India. 12mo., pp. 335. Milwaukee: J. L. Hauser & Co.

This little volume is a series of pen pictures drawn from life, and expressed in popular and attractive style. The book is about equally divided between India and China. It is a fine contribution to our missionary literature.

Vanquished Victors; or, Sketches of Distinguished Men who overcame the Obstacles in their Way to Fame, but failed to gain the Self-mastery which is the Greatest and Grandest of all Conquests. By DANIEL WISE, D.D., author of "Uncrowned Kings," "Story of a Wonderful Life," etc. 16mo., pp. 295. Cincinnati: Hitchcock & Walden. New York: Nelson & Phillips. 1876.

A series of brief portraitures of remarkable men.

Christian Nurture. By HORACE BUSHNELL. 12mo., pp. 407. New York: Scribner, Armstrong, & Co. 1876.

Sermons on Christ and His Salvation. By HORACE BUSHNELL. 12mo., pp. 456. New York: Scribner, Armstrong, & Co. 1877.

Sermons for the New Life. By HORACE BUSHNELL. Revised edition. 12mo., pp. 456. New York: Scribner, Armstrong, & Co. 1876.

We are gratified to notice that Scribner, Armstrong, & Co. are issuing a fine new edition in series of Dr. Bushnell's works. Christian thinkers will find in them ample starting-points for thought.

The Student's Classical Dictionary of Biography, Mythology, and Geography. Abridged from the larger Dictionary. By WILLIAM SMITH, D.C.L., LL.D., With Illustrations. 12mo., pp. 438. New York: Harper & Brothers. 1877.

This is a highly scholarly and densely compressed manual, admirably adapted to the "student's" use. The abundance of illustrations, true to archæology, forms a valuable characteristic of the volume.

The Methodist Almanac for the Year of our Lord 1877. Being the 101st Year of the American Independence and the 111th of American Methodism. 12mo., pp. 60. Edited by W. H. De Puy, D.D. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden.

Rachel Weeping for her Children. By Rev. N. VANSANT, of the Newark Conference. With an Introduction, by Rev. C. N. SIMS, D.D. 16mo., pp. 150. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1876.

A beautiful gift for parents weeping for departed children.

Fleda and the Voice. With other Stories. By MARY A. LATHBURY, ("Aunt May.") Illustrated by the Author. Quarto, pp. 69. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden.

A highly illustrated and beautifully written holiday gift for the young folks.

History of the Reformation in Europe in the Time of Calvin. By Rev. J. H. MERLE D'AUBIGNE, D.D. Translated by WILLIAM L. R. CATES. Vol. VII: Geneva, Denmark, Sweden, Norway, Hungary, Poland, Bohemia, the Netherlands. 12mo., pp. 576. New York: Robert Carter & Brothers. 1877.

The Rime of the Ancient Mariner. By SAMUEL TAYLOR COLERIDGE. Illustrated by GUSTAVE DORE. Folio. New York: Harper & Brothers. 1876.

A unique and very splendid gift book.

The Footsteps of St. Peter. Being the Life and Times of the Apostle. By J. R. MACDUFF, D.D., author of "The Footsteps of St. Paul," "Memoirs of Gennesaret," "Morning and Night-watches," etc., etc. 12mo., pp. 632. New York: Robert Carter & Brothers. 1877.

My Old Letters. By HORATIUS BONAR, D.D. 12mo., pp. 352. New York: Robert Carter & Brothers. 1877.

Synoptical Lectures on the Books of Holy Scripture. Third Series: Romans, Revelation. By Rev. DONALD FRASER, D.D. 12mo., pp. 306. New York: Robert Carter & Brothers. 1873.

The Judgment of Jerusalem Predicted in Scripture, Fulfilled in History. By Rev. WILLIAM PATTON, D.D., New Haven. 12mo., pp. 231. New York: Robert Carter & Brothers. 1877.

Rays from the Sun of Righteousness. By Rev. RICHARD NEWTON, D.D., author of "The Jewel Case," "The Wonder Case," etc. 12mo., pp. 341. New York: Robert Carter & Brothers. 1876.

The True Man, and other Practical Sermons. By Rev. SAMUEL S. MITCHELL, D.D. 12mo., pp. 236. New York: Robert Carter & Brothers. 1877.

The Uncommercial Traveler, Hard Times, and the Mystery of Edwin Drood. By CHARLES DICKENS. With forty-five Illustrations. 8vo., pp. 328. New York: Harper & Brothers. 1876.

Hay Fever; or, Summer Catarrh: Its Nature and Treatment. Including the early form, or "Rose Cold;" the latter form, or "Autumnal Catarrh;" and a middle, or "July Cold," hitherto undescribed. Based on Original Researches and Observations, and containing Statistics and Details of several hundred cases. By GEO. M. BEARD, A.M., M.D. 12mo., pp. 266. New York: Harper & Brothers.

Oliver of the Mill. A Tale. By MARIA LOUISA CHARLESWORTH, author of "Ministering Children," etc. 12mo. New York: Robert Carter & Brothers. 1877.

The Lesson Compend for 1877. By Rev. JESSE LYMAN HURLBUT, A.M. 12mo., pp. 137. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden.

The Development Hypothesis: Is It Sufficient? By JAMES M'COSH, D.D., LL.D., President of Princeton College. 12mo., pp. 104. New York: Robert Carter & Brothers, 530 Broadway. 1876.

Gems and Pearls for Parents and Children. By Rev. E. DAVIES. 12mo., pp. 154. For sale by the Rev. E. Davies, Reading, Mass.; J. P. Magee, 36 Bromfield-st., J. H. Earle, Hawley-st., Boston; J. S. Inskip, 921 Arch-st., Philadelphia; and booksellers generally.

Practical Cooking and Dinner-Giving. A Treatise, containing Practical Instructions in Cooking, in the Combination and Serving of Dishes, and in the Fashionable Modes of Entertaining at Breakfast and Dinner. By Mrs. MARY F. HENDERSON. Illustrated. 12mo., pp. 364. New York: Harper & Brothers. 1876.

The Other Gipsy. By JOSEPHINE POLLARD. 16mo., pp. 162. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1876.

Mister Horn and his Friends; or, Givers and Giving. By MARK GUY PEARSE, Author of "Daniel Quorm," "Sermons for Children," etc. 16mo. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1876.

The Berean Question Book. International Series, for 1877. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1877.

Through the Eye to the Heart; or, Eye-Teaching in the Sunday-School. By Rev. W. F. CRAFTS. 12mo. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1876.

Old Tales Retold from Grecian History. By AUGUSTA LARNED. 12mo. New York: Nelson & Phillips. Cincinnati: Hitchcock & Walden. 1877.